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THESIS

THE ECONOMICS OF THE DRUG WAR: EFFECTIVE FEDERAL POLICY OR MISSED OPPORTUNITY?

by

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We calculated the value of two distinct economic inefficiencies that result from the prohibition of drugs. We define and illustrate these inefficiencies as the two direct components of the deadweight loss created by prohibition. The first is under-consumption and the second component, unique to our analysis, is the payment for risk. Using the 1999 illegal quantities and prices, the derived legal prices, and the estimated demand elasticities for four illegal drugs, we calculated the estimated quantity demanded for these drugs in legal markets. We then used the results of these calculations and estimated the total deadweight loss of the drug war in 1999 to be over $90 billion—$65 billion in payment for risk and $24 billion in under-consumption. We then focus our analysis on the indirect components of the deadweight loss, e.g., costs to reduce supply, cost of incarceration, and productivity losses, etc. Our conservative estimate for indirect deadweight loss for 1999 was $96.1 billion. In the final chapter, we estimate that of the total deadweight loss, America could gain $6.7 billion annually in taxes from legal drug sales, save over $34 billion annually in drug war costs, and recoup the remainder via reductions in prohibition-related phenomena.

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ABSTRACT

We calculated the value of two distinct economic inefficiencies that result from the prohibition of drugs. We define and illustrate these inefficiencies as the two direct components of the deadweight loss created by prohibition. The first is under-consumption and the second component, unique to our analysis, is the payment for risk. Using the 1999 illegal quantities and prices, the derived legal prices, and the estimated demand elasticities for four illegal drugs, we calculated the estimated quantity demanded for these drugs in legal markets. We then used the results of these calculations and estimated the total deadweight loss of the drug war in 1999 to be over $90 billion—$65 billion in payment for risk and $24 billion in under-consumption. We then focus our analysis on the indirect components of the deadweight loss, e.g., costs to reduce supply, cost of incarceration, and productivity losses, etc. Our conservative estimate for indirect deadweight loss for 1999 was $96.1 billion. In the final chapter, we estimate that of the total deadweight loss, America could gain $6.7 billion annually in taxes from legal drug sales, save over $34 billion annually in drug war costs, and recoup the remainder via reductions in prohibition-related phenomena.

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I. METHODOLOGY AND SCOPE

A. INTRODUCTION

There is increasing concern today that America's war on illegal drugs is failing to accomplish its primary goals, despite the commitment of a large and an ever-expanding investment of tax revenues and other scarce resources. Despite the many supply-side successes such as crop eradication, the dismantling of major international drug trafficking organizations, and constant border seizures of large drug shipments, little progress has been made to reduce illegal drug use by America's youth, to decrease drug related violence in our cities, or to affect the exposure of the non-drug using population to the negative externalities of the illegal drug trade. Our supply-side war against drugs is costing our nation billions of dollars and hundreds of thousands of man-hours per year to fight and, yet, it seems, we continue to take at least one step back for every step forward. The problem may be that we are throwing good money, and, more importantly good people, into a solution that has very little chance for success. Information published by the United Nations International Drug Control Program (UNDCP) and by the United States Drug Enforcement Agency (DEA) seems to support the assertion that money used to fight the drug war is ill spent. Recent reports from both agencies reveal that the availability, purity, retail prices, and most surprisingly, the consumption rates for illicit drugs have not noticeably changed since the late 1980s despite ever-increasing levels of federal funds that the U.S. government dedicates to this problem. In light of the attacks of 11 September, it may be prudent to find a better alternative to fighting the drug war because this policy and, specifically, its enormous economic consequences, forces America to forego other (arguably more pressing) opportunities in national security and homeland defense. In our limited research of the subject thus far, we have been led to question the effectiveness of the supply-side war against drugs. As students of economics and not of drug interdiction policies, therefore, we believe that a calculation or estimation of some components of the economic efficiency of these goals is warranted.

This research objectively evaluates the overall economic efficiency of America's drug policy. The ultimate goal of the research is to determine whether or not America's

prohibitive policy towards the illicit drug market is efficient in achieving four of the five total goals stated in the *2000 National Drug Control Strategy*, and ultimately to suggest the degree to which its policy is an effective use of our limited resources. The goals of the drug war we evaluate are (1) Increase the safety of America's citizens by substantially reducing drug-related crime and violence, (2) Reduce health and social costs to the public of illegal drug use, (3) Shield America's air, land, and sea frontiers from the drug threat, and (4) Break foreign and domestic drug sources of supply. Our analysis will initially focus on reviewing the available literature that outlines the overall costs (benefits) associated with achieving each of these goals under the current methodologies employed. We will then focus our attention on estimating the deadweight or social welfare loss caused by the criminalization of the use and trade of certain drugs. Once computed, this estimate, together with the cost information, serves as the foundation for an in-depth analysis of the relevant opportunity costs that the U.S. government accepts as a result of this policy decision, focusing on opportunities foregone in national defense. Finally, the thesis proposes an alternative approach to this federal policy.

B. BACKGROUND

Before embarking on this analysis, it is important to understand exactly where America's paternalistic approach to controversial policy issues, specifically in the area of intoxicating drugs, originated. This uniquely American perspective can be traced back to 1869 when the Rev. John Russell of Michigan, working through a Masonic organization, organized a prohibition convention in Chicago in 1869. The formation of the Prohibition Party and the selection of Mr. James Black of Pennsylvania as its first presidential candidate in 1872 marked the beginning of organized efforts to ban the sale of intoxicating liquors and, more important, served as the foundation for America's prohibitive approach to its most difficult societal woes. (Keel, Robert, Drug Law Timeline, University of Missouri at Saint Louis) During the nineteenth century, opium, heroin, and morphine were sold legally and conveniently throughout the United States. These narcotics flowed through five broad and perfectly legal distribution channels, 1) physicians via prescriptions, 2) drugstores, 3) grocery and general stores, 4) mail-order, and 5) the flourishing patent medicine industry. (Brecher, Consumer Reports Magazine,

1972) Although non-medicinal opiate use was frowned upon as immoral, during this period wives did not typically divorce their addicted husbands, nor husbands their addicted wives. Children were not taken from their homes because one or both parents were addicted and most important, addicts continued to participate fully in the life of the community, holding jobs, attending school and otherwise contributing to society (Brecher, Consumer Reports Magazine, 1972). At the same time, the anti-alcohol movement was rapidly gaining ground and prohibitionist sentiment towards alcohol and those who used it was much more fervent and organized. Despite the conflicting perspectives and circumstances surrounding drugs and alcohol, the prohibition of opiates preceded the prohibition of alcohol by five years with the passage of the Harrison Narcotics Act on December 17, 1914. The Harrison Bill was not originally passed as a result of a public outcry or social crisis but rather to satisfy the parties of the Hague Convention of 1912, which was aimed at solving the opium problems occurring in the Far East, not in the United States. Furthermore, it was not even intended to be a prohibition law but rather a law calling for the orderly marketing of opium, morphine, heroin, and other drugs over the counter in small quantities and in larger quantities on a physician's prescription. (Brecher, Chapter 8) Unfortunately, the widely held negative moral stigma associated with the non-medicinal use of opiates led law enforcement agencies to interpret the law as prohibiting all drug use whether or not the use was legitimately medicinal or non-medicinal. This was, for all practical purposes, the beginning of drug prohibition.

The net effects of the Harrison Bill were immediately visible as reported in the New York Medical Journal on May 15, 1915, just six weeks after the effective date of the prohibitive legislation. The Journal wrote:

> As we expected…the immediate effects of the Harrison antinarcotic law were seen in the flocking of drug habitués to hospitals and sanatoriums. Sporadic crimes of violence were reported too, due to the desperate efforts by addicts to obtain drugs, but occasionally to a delirious state induced by sudden withdrawal. ("Mental Sequelae of the Harrison Law," New York Medical Journal, 102 (May 15, 1915): 1014)

Five years later in 1920, fiscal and government effects of Prohibition became very clear as the total money spent on Prohibition of alcohol and drugs at the federal level was

$3.59 million, an enormous sum by relative standards. By 1930, it rose to $44.03 million --a 1226% increase--and federal prison construction was in the process of doubling. Meanwhile, the estimated number of sentenced prisoners under the jurisdiction of state and federal authorities increased from 91,669, in 1925 to 137,997 in 1932, a 51% increase in just 7 years and an unprecedented increase for the time (Maguire and Pasture, 2001)

Almost forty years after the enactment of the Harrison bill, thirty-four years after the 1919 Volstead Act and Eighteenth constitutional amendment that effectively criminalized the sale, consumption, and trafficking of intoxicating alcoholic beverages, and twenty years after the repeal of Prohibition, Rufus King, Esq., chairman of the American Bar Association's committee on narcotics, summed up his personal views and those expressed by a number of renowned commissions and committees convened to study the effectiveness of both alcohol and drug prohibition, in the Yale Law Journal:

> So long as society will not traffic with him (the addict) on any terms, he must remain the abject servitor of his vicious nemesis, the peddler. The addict will commit crimes – mostly petty offenses like shoplifting and prostitution – to get the price the peddler asks…All the billions our society has spent enforcing criminal measures against the addict have had the sole practical result of protecting the peddler's market, artificially inflating his prices, and keeping his profits fantastically high. No other nation hounds its addicts as we do, and no other nation faces anything remotely resembling our problem. (King, 1953, pp.748-749)

Current prohibitive efforts to combat illicit drug use can be traced to 1972 when President Nixon identified illicit drugs as "public enemy number one" and coined the phrase "War on Drugs." Later in 1985, crack cocaine exploded onto the scene in New York and other major metropolitan areas and consequently, in 1986, President Reagan signed the Anti-Drug Abuse Act of 1986, which appropriated $1.7 billion to fight the drug crisis, and included the very controversial creation of mandatory minimum sentencing requirements for drug offenses. Only 9 years after the 1989 creation of America's first "drug czar," President Clinton's $15.2 billion 1998 drug control budget was a 6.3% increase over the $14.3 billion 1997 budget and a 1,850% increase in real terms over President Nixon's first drug budget proposal in 1972 of $200 million. (*FY 2002 National Drug Control Budget,* April 2001) Between 1989 and 1998, the federal

government budgeted and spent close to $116 billion in total to combat the illicit drug problem. The combined local and state spending on drug policy during that period was close to $350 billion. Was all of this money doing the job of combating the drug problem? The result is highly debatable.

C. SCOPE

Considering the magnitude of this level of funding at the federal, state, and local levels, this thesis calculates some of the relevant costs incurred thus far in achieving the goals outlined by the national drug control policy. Specifically, the thesis develops estimates of the quantities of specific illicit drugs available in the United States. Additionally, we use both historical and current price estimates for the same set of illicit drugs in order to develop an approximation of the current illicit drug market in the United States. After this model is developed, the thesis estimates the social and/or deadweight loss caused by drug prohibition based on the most widely accepted assumptions regarding the market effects of the legalization or federal decriminalization of this market.

D. METHODOLOGY

The analysis reviews the relevant literature to capture the costs incurred relative to the benefits realized. In doing so, we estimate the costs of the drug war. Moreover, we calculate the social or deadweight loss to society as a result of the criminalization of drugs. We show substantial inefficiencies, and then we consider whether legalization of drugs will accomplish the *2000 National Drug Control Strategy* goals mentioned earlier, while simultaneously freeing up precious federal funding for other, more marginally efficient and effective programs.

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II. HISTORY OF PROHIBITION

A. INTRODUCTION

To effectively estimate the deadweight loss caused by America's drug war, it is important to first define the premises on which Prohibition is based. Since the ultimate goal of this thesis is to calculate whether the drug war does more harm than good, it is necessary to identify its proclaimed goals and to compare them with what has actually been achieved. These goals are based largely on the premises that drug use is immoral and that those who use drugs cause harm not only to themselves, but, more important, to society as a whole. The following section examines some significant historical prohibition legislation, defines the premises on which these laws were based, and provides examples from the current literature supporting the continued criminalization of drug use.

B. THE ORIGINS OF AMERICA'S DRUG PROHIBITION

America's prohibition movement is firmly rooted in—and has drawn a great deal of its legitimacy from—issues of morality. Comprehensive histories, written by people on both sides of the prohibition argument, document the key players and issues that eventually brought about the criminalization of certain drugs on the grounds of morality. William L. White illustrates the importance of morality as a foundation for prohibition:

> Current strategies toward the use and abuse of mood-altering drugs continue to be based on a set of beliefs generated from the prohibitionist movements of the late 19th and early 20th centuries . . . The cementing of these prohibitionist beliefs into the very social fabric of American culture is one of the primary barriers to changing an outmoded and nonfunctional social policy. The integration of these beliefs into our culture has been so complete that to question them is immediately experienced by the culture at large as an attack on the institutions that have proliferated these beliefs, e.g., our national leaders, the 1aw, our educational and religious institutions, and the family. (White, 1979)

In 1845, New York State enacted a law prohibiting the public sale of alcohol, based in large part on the actions and recommendations of John H. Griscom. Griscom

was a Quaker physician and social reformer who served as the New York City Inspector in 1840. Charles Rosenberg's book, *No Other Gods*, includes comments by Griscom:

> Griscom commented that "indulgence in a vicious or immoral course of life is sure to prove destructive to health, and from a low state of general health, whether in an individual or in numbers, proceed diminished energy of body and of mind, and a vitiated moral perception, the frequent precursor of habits and deeds, which give employment to the officers of police, and the ministers of justice." (June, 1993)

Griscom's comments echo beliefs espoused by members of the temperance movement, the preponderant prohibition advocates of the time. The temperance movement's objective was to end the consumption of alcohol in order to end the perceived problems caused by its use—poor hygiene and moral degeneracy (June, 1993, p.2). The movement consisted primarily of evangelical philanthropists, clergymen, and women's groups, all of whom believed that alcohol use caused many of the social ills of the time. Though the New York law was repealed in 1847 and the temperance movement failed to attract any federal legislative efforts until the next century, both succeeded in forever linking prohibition and morality.

The theme of immorality and drug use was reinforced later in the nineteenth century in the western United States, when laws were passed banning the sale or possession of smoking opium. The primary users were immigrant Chinese workers who owned and frequented opium dens in western cities. The efforts to prohibit the use of smoking opium are linked to morality as well:

> Opium smoking became a topic of political concern only when the immigrant-owned opium dens which dotted cities like San Francisco began to attract white patrons, and most alarmingly, white women. Fear spread that white women were being debauched in the opium dens . . . . (June, 1993)

The controversy over smoking opium is important to the principle theme of prohibition because it successfully, though perhaps incorrectly, linked the *cause* of immoral behavior (sexual promiscuity) to the use of drugs.

Despite some relatively small victories, such as those mentioned above, prohibitionists fought an uphill battle throughout the nineteenth century. The greatest obstacle they faced was our nation's form of government, a federation of independent

states whose goal was to remain sovereign and regulate themselves as they saw fit. Dr. David F. Musto, a Yale University psychiatrist, sums up the situation this way:

> The United States had no practical control over the health professions, no representative national health organizations to aid the government in drafting regulations, and no controls on the labeling, composition, or advertising of compounds that might contain opiates or cocaine. The United States not only proclaimed a free marketplace, it practiced this philosophy with regard to narcotics in a manner unrestrained at every level of preparation and consumption. (Musto, p. 2).

The introduction of federal control over ill-reputed substances really began with the Pure Food and Drug Act of 1906, which formed the Food and Drug Administration and effectively gave the federal government the power to regulate interstate commerce by requiring content labeling. The origins and intent of the Pure Food and Drug Act reside less in morality, however, and more in an attempt to protect consumers and prevent acute poisoning. Its impact on the drug problem was a drop in drug addiction—previously uninformed consumers could now identify those medicines with addictive ingredients—and a beginning to the end of the patent medicine industry. (Keel, p. 3)

The first significant national anti-narcotic law arrived in 1914 with the passage of the Harrison Act. Named for the congressman who sponsored the bill, it was our nation's obligatory response to The Hague Opium Convention agreement between the United States and other nations to curb the world opium trade. The seeds of the Harrison Act germinated when the issue of narcotics abuse first reached the federal level, shortly after the United States acquired the Philippines following the Spanish-American War. In the newly acquired Philippines, Civil Governor William H. Taft considered whether or not to reinstitute an opium monopoly originally established by the Spanish to provide the drug to the Filipinos. "It was his judgment that this would be reasonable and that profits from the opium monopoly could be used to help educate the Filipinos." (Musto, p. 6) The bill caught the attention of both Congress and President Roosevelt when missionaries in the United States and the Philippines "…learned that 'tainted money' from opium sales was to be employed for education, and they besought President Theodore Roosevelt to prevent this moral wrong." (Musto, p.6) Eventually, the federal government, under the leadership of Protestant Bishop Charles H. Brent, would convene the Shanghai Opium

Conference (which preceded The Hague Opium Convention) to deal with the drug trade problems in the Philippines, the United States, and the rest of the world. One important resolution of the Hague Convention was the agreement that each nation would regulate and control narcotics within its own borders.

Thus, the Harrison Act, also known as the Anti-Narcotic Act, was intended, in part, to carry out a treaty obligation. The Act had two primary goals: 1) to regulate the medical use of narcotics, and 2) to criminalize their non-medical use. To achieve its primary objectives, all who produced or sold opium or cocaine derivatives were required to conform to strict licensing, registration, and records-keeping guidelines concerning all illicit drug transactions. Moreover, the exact wording of the Act made it possible for federal officers to arrest any medical personnel who prescribed opiates to addicts. In the months to follow, nearly 100 physicians were convicted and imprisoned (Brecher, 1972, pp. 49-50). The Harrison Act, like many regulations of its kind, had *unintended consequences*, the most nefarious of which would be the creation of a new black market for illegal drugs. The Harrison Act—or, perhaps more accurately, its unintended results—would give way to future legislation to control the importation of opium, cocaine, and eventually marijuana, as well as both federal and state laws to criminalize those who participated in their use or trade.

The1922 Narcotic Drug Import and Export Act, for example, sought to eliminate the use of all narcotics, except in the legitimate use of medicines. And in 1924, the Heroin Act made it illegal to manufacture heroin or to use it for any reason. Marijuana joined the list of illicit drugs when it was criminalized in 1937 under the Marijuana Tax Act. Between 1937 and 1951, the focus of prohibition legislation was on establishing drug prescription guidelines, emphasizing drug safety, and defining controls granted to the FDA. The theme of prohibition changed dramatically, however, in 1951, when the federal government passed the Boggs Amendment to the Harrison Act. This amendment established mandatory sentencing for narcotic violations and began a new emphasis on legislation to punish drug traffickers and users more severely.

Between 1951 and 1968, three of the four acts or amendments passed set or increased criminal penalties for narcotics violations. In 1970, the Comprehensive Drug Abuse and Control Act, Title II, the Controlled Substance Act became “the legal

foundation of the government's fight against the abuse of drugs and other substances." (Drug Enforcement Agency) Thought to be the true beginning of the drug war, the act was a consolidation of many previous drug laws. Its primary objective was to categorize illicit drugs and to emphasize law enforcement (Keel, p.1). Three years later, the Bureau of Narcotics and Dangerous Drugs became the Drug Enforcement Agency (DEA), which continues to be the primary federal agency engaged in the drug war today. Throughout the next three decades, the government passed laws that either increased penalties for violators or provided for education and/or treatment of offenders. Additionally, the share of federal money and effort in the drug war shifted during that time from fighting demand to fighting supply.

Today, it is difficult to find a federal, state, or local agency that explicitly defines the reasons behind its support of prohibition. One prohibition theme that prevails today is that drug use causes sexual promiscuity, especially among children or adolescents. There is, in fact, a great deal of research that supports the premise that drugs such as alcohol and ecstasy reduce normal inhibitions, which may lead to riskier behavior. The moral foundations for this theme come from religious beliefs, particularly Christian, that premarital sex is wrong and from social theories regarding the burden of teen pregnancies on young women, their families and society. The following is a typical example from the current literature:

> Adolescents and other young adults who use drugs and alcohol often take risks that endanger their health and the health of others. One of the most harmful risks is that of engaging in risky sexual activities. Scientific research has demonstrated that the use of alcohol and drugs is related to the occurrence of unsafe sexual behavior that places adolescents at risk for pregnancy or contracting sexually transmitted diseases (STDs), such as HIV/AIDS . . . . (National Institute on Drug Abuse)

The Office of National Drug Control Policy (ONDCP) sets the strategic goals and objectives for reducing drug abuse and mitigating the consequences of drug abuse in the United States. One way to better understand the beliefs of the federal administrators who continue to promote criminalization today is to discern them from the ONDCP strategy and from those who authored it. In the 2001 Nation Drug Control Policy foreword, ONDCP Director Barry McCaffrey writes:

> If children reach adulthood without using illegal drugs, alcohol, or tobacco, they are unlikely to develop chemical-dependency problems later in life. To this end, the Strategy seeks to involve parents, coaches, mentors, teachers, clergy, and other role models in a broad prevention campaign
>
> - Drug dependence is a chronic, relapsing disorder that exacts an enormous cost on individuals, families, businesses, communities, and nations. Addicted individuals frequently engage in self-destructive and criminal behavior. . . .
>
> - [L]aw enforcement is essential for reducing drug use. Illegal drug trafficking inflicts violence and corruption on our communities. Law enforcement is the first line of defense against such unacceptable activity . . . .
> - Better organization along land borders and at air terminals and seaports will reduce the volume of illegal drugs reaching American communities . . . .
>
> - Drug trafficking threatens both the rule of law and human rights. Supply-reduction programs attack international criminal organizations, strengthen democratic institutions, and honor our drug-control commitments abroad . . . . (McCaffrey, 2001, p.1)

The first two paragraphs echo the themes of the past, when prohibition was first introduced: drug use by children is morally wrong, and drug dependence hurts society as well as the addict. However, the last three paragraphs, making up the majority of McCaffrey's comments, seem to reflect a new set of beliefs or themes generated by the unintended consequences of our war on drugs—the negative externalities of the drug war. There is less concern for individual drug users (aside from labeling their condition as "chronic, relapsing disorders") than was evident at the beginning of prohibition. The primary concern, it seems, has shifted from the perceived problems and morality of individual drug use to the real problems of *illegal* drug-related use, trade, and crime. The ONDCP strategy shapes the goals and objectives of the drug war, which, in turn, define the performance criteria by which our nation measures the effectiveness of its efforts to win the drug war.

Understanding the origins of prohibition and how the impetus for fighting drug use has changed over the years is important to our conclusions. In later chapters, we will use the ONDCP's set of beliefs, its stated goals and objectives, and, ultimately, its

performance criteria to help us calculate the dead weight loss of the drug war and to determine if it accomplishes what it is intended to.

C. ORIGINS OF LEGALIZATION: EXTREME LIBERTARIANISM OR SOUND ECONOMICS?

After examining the origins of American prohibition, it is equally important to discuss the origins and major characteristics of the most frequently cited alternative to prohibition, drug legalization. It is important to note that, unlike prohibition, the "legalization" movement did not result from any economic or political catalyst, but, rather, only from history. The passage of the Harrison Tax Act of 1914 and, later, the Marijuana Tax Act of 1937 effectively ended a period in American history when every illicit drug was legal and regulated wholly by free markets. In fact, in "The Consumers' Union Report on Licit and Illicit Drugs," arguably the landmark study on this topic, Edward Brecher and the editors of *Consumer Reports Magazine*, call nineteenth-century America a "dope fiend's paradise." (Brecher, 1972).

Going back even further in American history reveals that seventeenth-century colonial laws actually required farmers to grow hemp because it was considered an excellent source of fiber for manufacturing rope and sails for ships. Later in the eighteenth century, hemp was *the* primary crop grown by former U.S. Presidents George Washington at Mount Vernon and Thomas Jefferson at Monticello. (Keel, p. 1) As Brecher's report states, opium, heroin, and morphine were the most widely used drugs during the nineteenth century and were conveniently available at drugstores and via various other distribution channels. These drugs not only were available in the United States, but also were grown and manufactured here. Virginia, Tennessee, South Carolina, Georgia, Pennsylvania, Florida, Louisiana, California, Arizona, Massachusetts, New Hampshire, and many other states were all significantly involved in growing and distributing opium. Furthermore, opium eaters, as they were called in the medical literature of the day, came from every social class and were openly known and accepted. It was not until the latter part of the nineteenth century that drug use, specifically its non-medicinal use, started to draw disdain from certain factions of the American public. For

example, in the September 1881 edition of *Catholic World*, an anonymous writer made the following comments about opium use:

> The gentleman who would not be seen in a bar-room, however respectable, or who would not purchase liquor and use it at home, lest the odor might be detected upon his person, procures his supply of morphia and has it in his pocket ready for instantaneous use. It is odorless and occupies but little space . . . . [H]e zealously guards his secret from his nearest friend—for popular wisdom has branded as a disgrace that which he regards as a misfortune. (Brecher, 1972)

Although the non-medicinal use of opiates and other drugs were increasingly viewed as a source of moral degeneration and addiction during the latter part of the nineteenth century, no political organizations aimed at prohibiting these drugs existed. Originally, the contrived hysteria surrounding the "Chinese opium dens" in San Francisco led to the first laws banning the "smoking" of opium in the 1870s. Interestingly, these laws did not totally outlaw the consumption of opiates, but, rather, only the smoking of opium because that practice was viewed as particularly Chinese. This legislative action marked the start of the prohibition movement led by the Prohibitionist Party and the Temperance Movement in the United States. Similarly, the same type of catalyst for prohibition was also present in the 1930s, when marijuana was believed to create "sex starved Negroes." (Brecher, 1972) Once more, a contrived scare, rather than any widespread public upheaval, led to the Marijuana Tax Act of 1937.

Milton Friedman, the 1976 Nobel Laureate in economics, commented off-handedly while answering a question during his keynote address at the Fifth International Conference on Drug Reform Policy Reform that he has

> . . . always argued that there are two arguments against drug prohibition. One is from principle: that people ought to be responsible for themselves and the government has no business telling me what to ingest . . . . The other is the question of expediency. For a moment, waive the question of principle: are you doing more harm than good? (Friedman, 1991)

Because many before Milton Friedman have asked the same questions, literally hundreds of studies have been conducted on the appropriateness and effectiveness of U.S. drug policy. As early as 1930, only sixteen years after the Harrison Tax Act, eleven years after the Volstead Act, eight years after the Narcotic Drug Import and Export Act, and six

years after the Heroin Act, America was inclined to examine the effectiveness of alcohol prohibition. Calling for more spending on enforcement and tougher laws, "The Report on the Enforcement of the Prohibition Laws of the United States" presented a volume of evidence to counter the belief that prohibition was working. (Wickersham, 1931) In fact, the Wickersham Commission was the first federal assessment of law enforcement in the United States. It examined a variety of issues concerning the observance of Prohibition, the causes and costs of crime, the operation of federal courts, and the problem of official lawlessness. Unfortunately, rather than considering alternatives to Prohibition, the report only advocated tougher enforcement. Seventy-two years later, the Wickersham report represents the beginning of America's seemingly absolute inability to consider more-effective alternatives to prohibition.

The 1961 report "The Joint Committee of the American Bar Association and American Medical Association's report, Drug Addiction: Crime or Disease?" is another landmark document that reinforced the assertions of the Wickersham report. The results of this study are effectively captured in the following excerpt: "Drug addiction is primarily a problem for the physician rather than the policeman, and it should not be necessary for anyone to violate the criminal law solely because he is addicted to drugs." (King, 1961) This report concluded that drug addiction was a disease, not a crime, that harsh criminal penalties were destructive, that drug prohibition ought to be reexamined, and that experiments should be conducted with British-style maintenance clinics for narcotic addicts. (King, 1961)

Brecher et al's 1972 report was followed by reports and studies almost every year, the most significant of which are: *The Nation's Toughest Drug Law: Evaluating the New York Experience* (1977); *The Facts About Drug Abuse* (1980); *DEA Docket No. 86-22, DEA Chief Administrative Law Judge's ruling on medical marijuana use*(1988); and *A Wiser Course: Ending Drug Prohibition, A Report of the Special Committee on Drugs and the Law of the Association of the Bar of the City of New York* (1994). Although conducted in different locations, using a wide variety of methods and assumptions, these studies agree that the prohibitive drug policies of the United States have been manifestly unsuccessful because Americans, for the most part, are continuing to use a large variety of drugs, in greater strength and purity and more frequently. Given the upward

momentum of the federal budget designated for drug control over the last fifty years, these results seem to indicate that past U.S. drug policies have failed to achieve their stated objectives.

D. POTENTIAL COSTS . . . POTENTIAL BENEFITS

The results of the hundreds of drug policy studies that have been conducted can be distilled down to five basic approaches for drug policy reform. They are:

- **The crime approach** – attributes the development of a powerful organized crime structure and endemic crime caused by drug use to America's prohibitionist drug policies.

- **The personal freedoms approach** – believes that prohibition attempts to punish a crime without a real victim by infringing upon the constitutional rights of many non-drug users.

- **The cultural approach** – sees drug use not as an addictive, pathological problem, but as a matter of personal choice.

- **The health approach** – holds the view that the punitive drug laws place both drug users and society at large at greater risk. This approach is also popularly known as the "Harm Reduction" model.

- **The economic approach** – views prohibition as a serious impediment to the efficient allocation of scarce resources (e.g., federal funds). Believes prohibition is instrumental to the development of an illicit economy that negatively affects the legitimate economy but also disregards the opportunity costs and disincentives that accompany prohibition within the marketplace. (Arnao, 1993)

Each of these approaches contains unique characteristics that deserve in-depth research. However, this study will discuss only numbers one, three, and five because

they account for the majority of direct and indirect costs that are the focal point of our estimation of the deadweight loss.

1. The Crime Approach

In 2001, the total number of people locked up in federal and state prisons and local jails reached the two million mark. (Egan, 1999) In view of recent U.S. Census Bureau population figures, one of every 147 U.S. residents will be an inmate in an adult jail or prison sometime in the year 2001. (Egan, 1999) Furthermore, given the fact that not all prison sentences are for life, the number of people who will ever be in prison may be as high as one of every 125 U.S. residents. Experts predict that U.S. prisons will have to add the equivalent of 1,000 beds each month for perhaps another decade, simply to keep up with current rates of incarceration. Why are these figures important? Because in the federal system, nearly 60 percent of all people behind bars are there for drug violations, and 22 percent of those in state prisons and local jails are doing time for drugs. Those percentages are almost triple the rate of 15 years ago. (Egan, 1999) Allen J. Beck, a statistician for the U.S. Bureau of Prisons, stated, "In the federal system, growth is being driven by drug law violators and immigration violators coming in." (Ho, 2000) Current estimates are that it costs taxpayers between $26,000 and $37,000 annually to support each inmate incarcerated in American prisons—these are substantial drug-related opportunity costs. Couple these costs with the enormous economic incentives of today's illicit drug market (a typical wholesale drug distributor can make between $2,000-$4,000 per week) and it is easy to conclude that the crime approach offers a solid and highly defensible argument against prohibition.

2. The Cultural Approach

The cultural approach draws its strength from the fact that America was founded upon the principle of individual freedom. Much of the literature and case material citing this approach as its impetus for drug policy reform can be traced to John Stuart Mill and his classic 1859 article, "On Liberty." Mill eloquently argues:

> [T]he only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant.

> He cannot rightfully be compelled to do or forbear because it will be better for him to do so, because it will make him happier, because, in the opinions of others, to do so would be wise, or even right. These are good reasons for remonstrating with him, or reasoning with him, or persuading him, or entreating him, but not for compelling him, or visiting him with any evil, in case he do otherwise . . . . In the part which merely concerns himself, his independence is, of right, absolute. Over himself, over his own body and mind, the individual is sovereign . . . . But neither one person, nor any number of persons, is warranted in saying to another human creature of ripe years, that he shall not do with his life for his own benefit what he chooses to do with it. (Mill, 1859)

Mill continues by delving into the very issue that many reformists contend is at the very heart of America's current prohibitive drug policies, the issue of social rights. Deftly capturing the uniquely American perspective on social rights, Mill discusses many of the emotions and actions that surrounded the move to prohibit alcohol. In Chapter IV, Mill quotes one of the temperance movement's Alliance Secretaries when he writes:

> The Secretary, however, says, "I claim, as a citizen, a right to legislate whenever my social rights are invaded by the social act of another." And now for the definition of these "social rights." "If anything invades my social rights, certainly the traffic in strong drink does. It destroys my primary right of security, by constantly creating and stimulating social disorder. It invades my right of equality, by deriving a profit from the creation of a misery, I am taxed to support. It impedes my right to free moral and intellectual development, by surrounding my path with dangers, and by weakening and demoralizing society, from which I have a right to claim mutual aid and intercourse." (Mill, 1859)

This politician's perspective on alcohol prohibition is not very different from the view held by the vast majority of today's politicians concerning drugs. America's paternalistic push to preserve the "social rights" of every citizen has resulted in just the opposite. While attempting to protect some individuals from the effects of illicit drug use, the American government has, in fact, severely infringed upon the right of the silent victims of the current war on drugs, the addicts. Should society discount the worth of these individuals simply because they choose to ignore the addictive nature of illicit drugs? John Stuart Mill would argue that doing so would not only undermine the legitimacy of the state, but also severely tarnish the very freedom on which America is so

proudly founded. Unfortunately, the U.S. government has continued to ignore the lesson of Prohibition and continues to view this issue from a social rights perspective rather than from one based on cultural and personal freedom.

3. The Economic Approach

The final approach considered—the economic approach—will be used to perform this study's analysis and make its estimation of the social loss incurred as a result of the drug war. This approach views prohibition as a serious impediment to the efficient allocation of scarce resources (e.g., federal funds). It also suggests that prohibition is instrumental to the development of an illicit economy that not only negatively affects the legitimate economy, but also disregards the substantial opportunity costs and disincentives that accompany prohibition within the marketplace. Given that, as well as its quantitative nature, it is not surprising that this approach is popular among almost all economists. Milton Friedman, one of the most effective advocates of economic freedom and free enterprise, once said:

> When government—in pursuit of good intentions—tries to rearrange the economy, legislate morality, or help special interests, the costs come in inefficiency, lack of innovation, and loss of freedom. Government should be a referee, not an active player. In the United States, government has gone far beyond the basics. (Hodges, 2001)

Friedman goes on to say:

> Every friend of freedom . . . must be as revolted as I am by the prospect of turning the United States into an armed camp, by the vision of jails filled with casual drug users and of an army of enforcers empowered to invade the liberty of citizens on slight evidence. (Friedman, 1989)

Friedman's comments capture the essence of the economic approach to drug legalization. Not only does prohibition result in the loss of personal freedom, as outlined in the cultural approach, but it also results in the inefficient allocation of scarce federal funds. In his 1972 *Newsweek* article criticizing President's Nixon's declaration of war on drugs and, later, in his article "The Drug War as a Socialist Enterprise," Friedman repeatedly cites examples of how America's punitive drug policies are not only economically inefficient, but also have all of the features of socialism. That is, the enterprise is

inefficient, expensive, very advantageous to a small group of people, and harmful to a lot of people. (Friedman, 1972; Friedman and Szasz, 1992). Despite all of these disturbing consequences, today's drug policies continue to thwart even the most focused efforts to initiate a national dialogue on drug policy reform. However, the ability to quantify many of the various negative externalities in terms almost every American can understand (i.e., dollar figures) makes this approach very appealing to reform-minded politicians, politically-aware citizens, and, more importantly, an ever-growing population of Americans who may very well be eager to end Nixon's "drug war" legacy.

E. CONCLUSION

This chapter has outlined a number of items critical to a clear understanding of America's drug market. First and foremost, the origins of this market lie within our own borders. The roots of today's "illicit" drugs can be traced back hundreds of years and can even claim legitimate associations with various U.S. Presidents, along with numerous, very prominent Americans throughout history. Second, drug prohibition and its punitive policies were not initiated as a consequence of any national political movement or referendum, but, rather, from the efforts of a small, focused group of temperance-minded politicians and their supporters. Third, today's legalization movement consists of a number of different approaches, each with different measures, effects and manifestations; however, all strive for the same societal goal—an improved quality of life. Finally, drug legalization could, quite possibly, reduce crime, increase personal freedom, reduce harm, and improve economic efficiency. In the end, these measures simply represent different paths to the same goal. This project aims to estimate the economic inefficiency resulting from today's drug policies and, more important, to make recommendations for change using the economic approach to drug legalization.

III. DEADWEIGHT LOSS AND THE PAYMENT FOR RISK

A. INTRODUCTION

This chapter reacquaints the reader with some basic economic theory in order to lay a foundation for the estimates calculated in Chapter IV. We begin with a description of consumer's surplus, producer's surplus and social gain, emphasizing each of their relationships to the illicit drug market. We then define deadweight loss and give two examples of it caused by taxation and regulation. Ultimately, we define the components of a deadweight loss in the illegal commodities market. Integral to this thesis is the definition of the *payment for risk* component of the deadweight loss. Our research shows that this component is unique to illicit markets and contributes substantially to the overall deadweight loss of the drug war. This chapter concludes by outlining the necessary assumptions in estimating the deadweight loss caused by America's prohibitive drug policies.

B. CONSUMER'S SURPLUS, PRODUCER'S SURPLUS AND SOCIAL GAIN

When a product in demand is regulated or taxed, the biggest loss to society often comes from a loss in consumer's surplus. For each of the illicit drugs analyzed in this thesis, we must accurately predict the consumer's surplus for that drug under both regulated and free-market conditions. This proves to be a challenge, primarily due to the absence of reliable information about consumer purchasing behavior under free-market conditions. Consequently, a number of assumptions about the market demand for those commodities under legal trade are required to estimate consumer surplus. Good consumer information from today's regulated environment, however, is widely available. The end of this chapter lists the set of assumptions we use to calculate consumer's surplus.

We begin with a quick review of consumer's surplus and an illustrative example. Consumer's surplus is the amount by which the value of a purchase exceeds what is actually paid for it. To graphically depict consumer's surplus, we must know the individual or market demand curve and the corresponding supply curve for a given

product. The demand curve is a graph that illustrates the quantity of a product demanded for each given price, and the supply curve represents the quantity supplied at various prices. Thus, on a graph, consumer's surplus is the area under the demand curve down to the price paid and out to the quantity demanded. (Landsburg, 1998, p. 246).

Consider, for example, the demand curve for product A in Figure 3.1 below. The demand curve is derived from the value that the market places on product A. Suppose consumers purchase five units of product A at $5 each in this market. The total cost to consumers is $25, and yet a quick calculation determines that the total value they gain is much higher: $18+14+10+7+5 = $54. The total value of their purchases minus what they actually paid is the consumer's surplus ($54- $25 = $29).

For the purpose of our estimation, we can assume with a high degree of certainty that people who purchase and use drugs, much like consumers of any commodity, realize some value of consumer's surplus at various quantities of exchange. As we illustrate in later examples, consumer's surplus suffers; however, the moment price increases as a result of regulation.

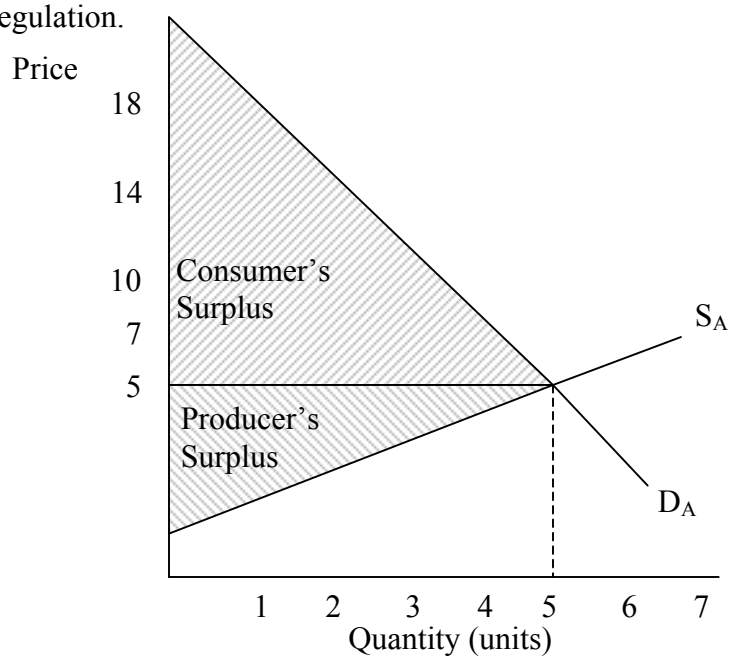


Figure 3.1. Consumer's and Producer's Surplus.

Producer's surplus, also commonly referred to as rent, represents the producer's gain from the exchange. It is the amount by which his revenue exceeds his variable production costs, or the "payment to a factor of production in excess of the minimum payments necessary to call it into existence." (Landsburg, 1999, p.247). Producer's

surplus can be graphically determined in much the same way as consumer's surplus. Using the same graph, producer's surplus is represented by the area above the supply curve up to the exchange price and out to the quantity purchased. For the sake of review, the supply curve essentially is the producer's marginal cost curve, excluding fixed costs. In the case of our example, the producer's total revenue from the sale of five units of product A is $25 and his production costs are $12.50; therefore, his producer's surplus is $12.50. Interestingly, the rent paid to drug traffickers can be viewed as a return on their "criminal skills."

Social gain is the sum of consumer and producer surpluses. Social gain represents the total gain to society as a result of markets and the execution of trades. In this example, the social gain from the trade of five units of product A is $41.50—the pure benefit to society of unrestricted, unregulated, and untaxed trade. Important to our research is what happens to social gain when one or more impediments are introduced into the free market. Often the result is deadweight loss.

C. DEADWEIGHT LOSS

Deadweight loss is simply a reduction in social gain. Several restrictions—such as taxes, tariffs, regulations, and collusion—can cause a loss in welfare gain. To demonstrate deadweight loss as a result of a sales tax and, more importantly, to establish a comparison to the deadweight loss as a result of regulation (drug war), consider Figure 3.2, taken from *Price Theory and Applications* on the following page (Landsburg, 1999, p. 254). In this market, the consumer's and producer's surplus are equally reduced as a result of the sales tax—each party is forced to absorb a portion of the tax—though given different elasticities of demand or supply, the producer and consumer may absorb more or less of the cost. In any case, the government collects the tax revenues and presumably distributes them back to society in one form or another. Therefore, the tax revenues are still considered a gain to society and are, thus, added to the remaining consumer's surplus and producer's surplus to determine the resulting social gain. Unfortunately, the total gain to society is less than before the tax was imposed, and this reduction in social gain is the deadweight loss. The deadweight loss created by the sale tax is *comprised solely of*

the under-consumption of the product being taxed—consumers buy less than they want to buy because of the higher price.

	Before Sales Tax	After Sales Tax
Consumer's Surplus	A + B + C + D + E	A + B
Producer's Surplus	F + G + H + I	I
Tax Revenue	--	C + D + F + G
Social Gain	A + B + C + D + E + F + G + H + I	A + B + C + D + F + G + I
Deadweight Loss	--	E + H

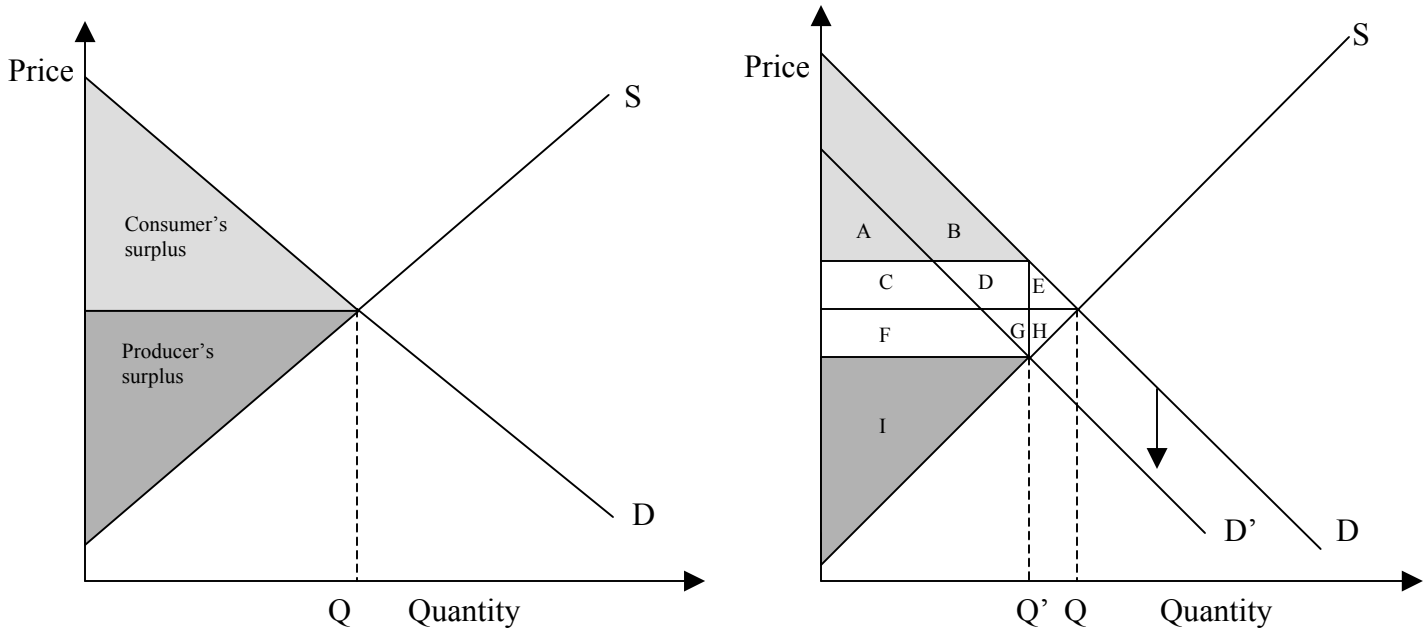


Figure 3.2. The Effect of a Sales Tax, From Landsburg.

In contrast to a sales tax, and perhaps the most important premise of our thesis, the deadweight loss created by the illegal sale of commodities (drugs) is composed of more than just under-consumption, though under-consumption is an important component. The most striking and the largest addition to the deadweight loss is what we will call a payment for risk, which we discuss at length in the following paragraphs. Let's take a more in-depth look at each of these components of the deadweight loss.

1. The Under-Consumption of Drugs

In our attempt to estimate the loss of social gain as a result of the criminalization of drugs, we apply the standards of economics. We take the controversial point of view that the reduction in use of what many believe to be harmful and even 'immoral' substances would have a negative impact on society. However, it is necessary and correct to do so in our analysis. We make no moral judgments about the use of drugs in our estimation, though we do question, to some extent, what many proponents of prohibition regard as the harmful effects of drug use to both individuals and society. In fact, there are studies—from the National Academy of Sciences, for example—that promote the medicinal use of marijuana for pain relief, control of nausea and vomiting, appetite stimulation, and control of movement. Furthermore,

> [f]or patients such as those with AIDS or who are undergoing chemotherapy and who suffer simultaneously from severe pain, nausea, and appetite loss, cannabinoids drugs might offer broad-spectrum relief not found in any other single medication. . . . [T]he most encouraging clinical data on the effects of cannabinoids on chronic pain are from three studies of cancer pain (Joy, Watson, Benson, 1999, p. 177).

The medicinal use of marijuana provides, perhaps, a more palatable argument when suggesting that the underutilization of illicit drugs is, in fact, a real and measurable loss to society.

The same component of deadweight loss can be calculated for consumers of alcohol, another controversial product. People who demand alcoholic beverages buy less or none at all because the prices are higher as a result of taxation. The bottom line is that there are consumers out there who want to purchase certain quantities of certain drugs for

their personal use, but who either buy less or none at all because of the inflated prices caused by the drug war. And strictly applying the standards of economics to illegal markets shows that these restrictions result in a deadweight loss.

2. The Payment for Risk

Drug buyers are not the only ones who take risks. Drug suppliers face many risks in their efforts to grow, manufacture, distribute, and bring their products to market. The owners of capital demand a rate of return commensurate with the degree of risk they face on each investment. Thus, the high risks of the drug war necessitate a high rate of return. Facing the risk of property seizure, incarceration, and physical harm, the laborers in these markets demand premium wages for their efforts. Suppliers must pay these wages, as well as other expenses—such as bribes—that are unique to illegal markets. Thus, it is no surprise that suppliers require a high price for supplying any given quantity of drugs. These exorbitant costs and the resulting higher prices are purely the result of doing business in illicit commodities. The payment for the risks taken to trade in illegal commodities is a component of the deadweight loss from the drug war that has yet to be considered or estimated—it is the crux of our thesis.

To fully appreciate this analytical approach, consider the economic effects of a government-imposed price ceiling. The deadweight loss created by a price ceiling differs from that created by a sales tax. As demonstrated in Figure 3.2, the area (C+D+F+G) representing the revenues collected by the government in the form of a tax is not part of the deadweight loss because the revenues are redistributed to society. However, in the case of a price ceiling, the value represented by the same area is not returned to society as a gain, but, rather, becomes a cost.

> . . . Depending on the nature of the good, this [cost] may take the form of standing in line, searching from store to store, advertising, or any of a number of other possibilities. All of these activities are costly, in time, gasoline, energy, and other currency, and these costs must be added to the "price" that consumers actually pay for the item. (Landsburg, 1998, p.266)

Figure 3.3 illustrates the deadweight loss resulting from a price ceiling in a legal market. Notice now that the deadweight loss to society has expanded from our sales tax example to include area B + D, and the true cost to consumers is P_1 and not P_0, the price paid to

producers. Area B + D represents the additional cost to consumers in terms of time and energy spent waiting in line, for example.

	Before Sales Tax	After Price Ceiling
Consumer's Surplus	A + B + C	A
Producer's Surplus	D + E + F	F
Social Gain	A + B + C + D + E + F	A + F
Deadweight Loss	----	B + C + D + E

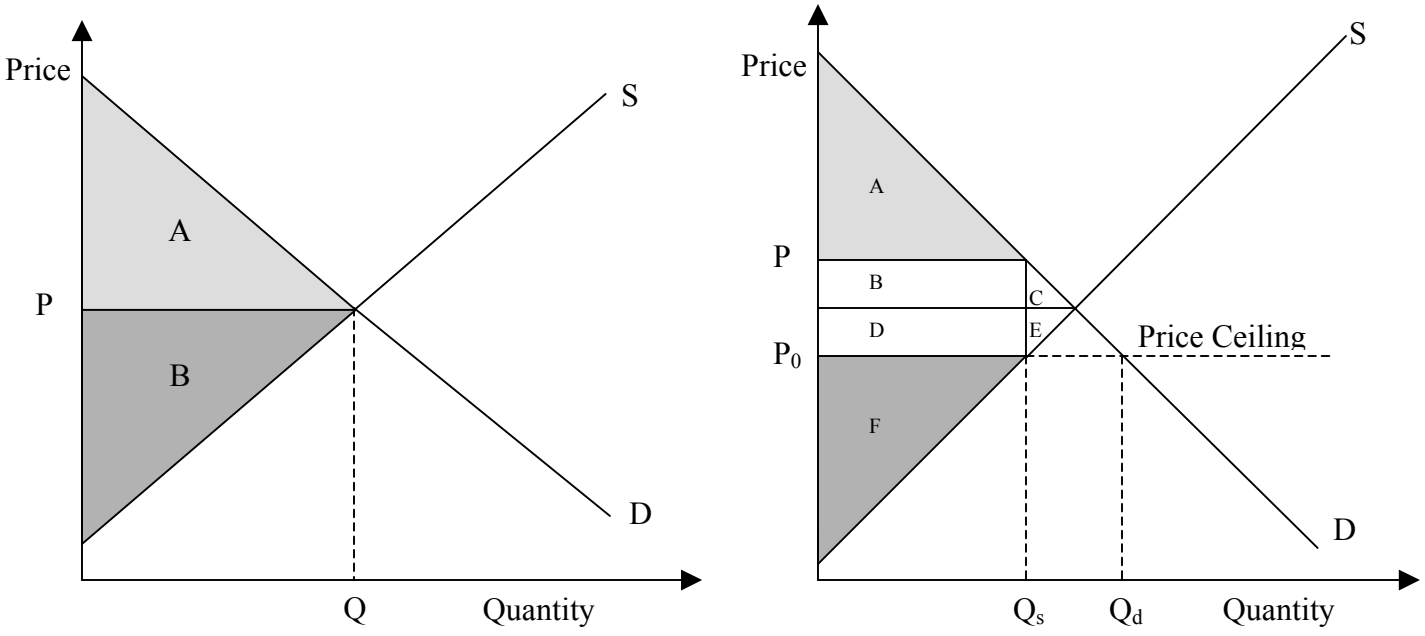
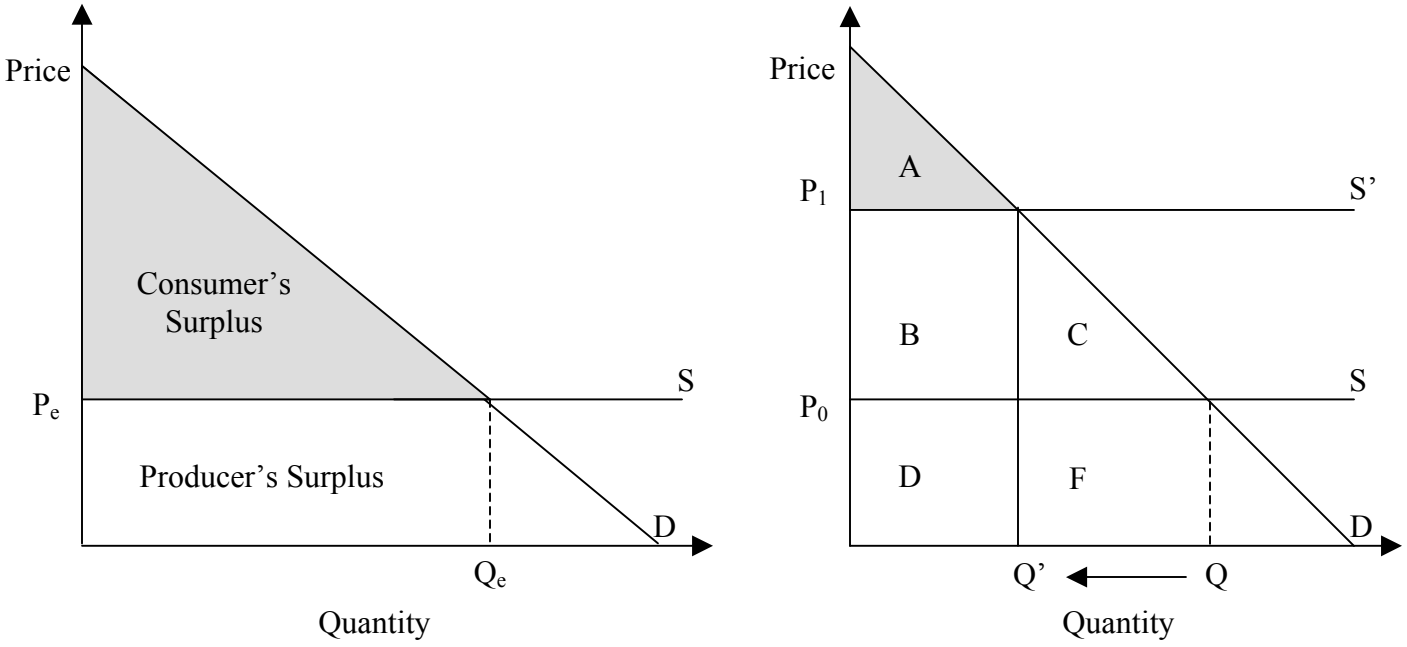


Figure 3.3. Price Ceiling, After Landsburg [p. 267]

The illegal drug market is, essentially, a special case of a price ceiling where the price is zero. (Rasmussen and Benson, 1994, p. 40) The additional cost that consumers pay and that producers charge is a reflection of their willingness to bear the risks associated with participation in an illegal activity. And just as the non-monetary costs of a price ceiling must be subtracted from the social gain of legal exchange, so must the payments and non-monetary cost of risk be subtracted from the social gain of illegal exchange. In Figure

3.4, note the large areas from both consumer's and producer's surplus that have been lost as a result of criminalization.

	Legal Market	Illegal Market
Consumer's Surplus	A + B + C	A
Producer's Surplus	--	(see note)
Social Gain	A + B + C	A
Deadweight Loss	--	B + C
Under Consumption		C
Payment for Risk		B



Note: Assuming a perfectly elastic supply curve (horizontal), it is difficult to graphically depict the rents in this illegal market. For our purposes, we will assume that rent is a reasonable return on risk, say, five percent of area B. For a definition of "rents" in illegal markets, see later paragraphs in this chapter.

Figure 3.4. Legal vs. Illegal Markets.

Some skeptics may disagree with our assertion that those areas of consumer's and producer's surplus in Figure 3.4 are actually lost. After all, a great deal more currency is obviously changing hands in an illegal market verses a legal one. Aren't those monies redistributed throughout society in one form or another? And if they are, why can they

be considered social gain instead of deadweight loss? To gain a better perspective, consider the following analogy presented by David Henderson:

> . . . Assume that the government makes the penalties for producing, selling, importing, and consuming coffee equivalent to the penalties for engaging in the same activities with cocaine. . . . First, people who want to obey the law, a group that will include almost all current importers and sellers of coffee, will leave the business, both because the vast majority of the people in the business are not criminals and do not want to become criminals, and because the coffee business has suddenly been made much riskier. As sellers exit, the supply of coffee is lessened and the new equilibrium price is higher. This high price will lead to high apparent profits, but they are only apparent. Adjusted for the risks of capture, imprisonment, fines, and confiscation of property, the profits are actually a normal, competitive return to the people and capital that are in the newly-illegal industry. (Henderson, 1997, p. 3)

Many of the risks to consumers and producers of illicit drugs are fairly intuitive and common to most criminal activities. For example, the threat of the loss of legitimate income, the cost of legal representation, fees and fines, and of family separation as a result of incarceration are risks to most criminal activity. Drug users face the additional costs in time spent searching for drugs, "…as well as risk factors associated with unknown purity of drugs, toxicity of adulterants . . . [and the] threat of victimization. . . ." (Rasmussen and Benson, 1994, p.52). Interestingly, the risk of victimization, particularly to drug dealers (who, more often than not, happen to be drug users as well), appears to represent a substantial percentage of the overall payment for risk. A study conducted in Washington D.C. concluded that "…these individuals [drug dealers] are indeed subject to very high probabilities of injury or death relative to virtually any imaginable legal profession" (Rasmussen and Benson, 1994, p. 54).

What about the rent earned by those who deal in illicit drugs? Henderson explains rent in this fashion:

> . . . These profits will, though, be attractive to people who are good at adjusting to, and willing to accept, the risks of being in the illegal business. Who will these people be? They will be people who are already criminals or who are inclined to become criminals. The profits will give them a return on their "criminal skills," which include the ability to deal with shady characters, the ability to keep many pieces of data stored mentally rather than on paper or computer memory, and the ability and willingness to be completely ruthless in preventing their own capture.

> Those who are particularly "good" at these activities will earn what economists call "rents." That is, they will earn more than a competitive rate of return on their physical and human capital. . . . (Henderson, 1997, p.3)

What portion of his total payment would a drug smuggler who flies cocaine from Columbia to the United States, for example, consider profit, and what portion does he consider payment for risk? One way to find out is to ask him by how much we could reduce his payment per trip before he would stop flying. If the payment he receives per trip is $10,000, and he would be willing to fly for no less that $9,000, then the amount of rent is $1,000 and the payment for risk is $9,000. Consider those smugglers or other "criminals" throughout the distribution channel that actually do get caught. When a smuggler is caught, he often pays premium legal fees to avoid conviction. If convicted and sent to prison, he may pay further court costs and fines in addition to forfeiting future legal wages, time with family, etc. These are costs that smugglers presumably include in their risk assessment for fees—they are part of the $9,000 deadweight loss in our previous example. Incidentally, when smugglers or other criminals are caught and processed through the criminal system, society suffers additional deadweight loss in the form of prosecution and incarceration costs. We will sum in these indirect costs later.

D. ASSUMPTIONS

In the next chapter, we complete the calculations necessary to estimate the deadweight loss of the drug war. In order to make these estimations, however, we must make some assumptions about the shape and elasticity of both the supply and demand curves for drugs. We must also make some assumptions regarding their movements—i.e., increase or decrease—as a result of prohibition. These assumptions will make our calculations more accurate and less complicated.

1. Supply is Perfectly Elastic (Horizontal) in the Long Run.

We understand that the various drug supply curves must have some degree of upward slope simply because not every firm has the same opportunity costs or skills. Considering this, we assume that the production, distribution, and sale of drugs are most like those of commodities such as wheat or crude oil. Unfortunately, this assumption leaves no room for the calculation of rent, which we know must exist in either case—a flat supply curve crowds out producer's surplus, as illustrated in a previous example. Therefore, we must further assume a reasonable "return on risk" in the illicit markets. For our purpose and calculations, we use five percent.

The main reason for assuming a flat supply curve is that, given the huge reduction in price we find with legalization, assuming a flat supply curve would not affect our bottom-line estimation of the deadweight loss. Moreover, we can avoid the tremendous complexity associated with estimating the elasticity and slope of the various drug supply curves in our calculations and simultaneously reduce the potential for calculation errors.

2. The Exact Shift in the Demand Curve for Drugs as a Result of Prohibition or Legalization is Impossible to Predict Because of Offsetting Forces.

There is little doubt that law enforcement affects both the supply and the demand for illicit drugs. However, because the degree to which demand is affected is in doubt, the impact on our calculations is unpredictable. Prohibition exerts downward pressure on the demand curve in many ways. "A 'just say no' campaign, better information about the deleterious effects of drugs, and/or enforcement against users should cause a decline in demand. . . . "(Rasmussen and Benson, 1994, p. 68). Conversely, the reduction of risk to consumers as a result of legalization, for example, would certainly increase (or return to pre-prohibition level) demand. To complicate matters, there is evidence of upward pressure on demand, the so-called "forbidden fruit," as a result of prohibition. This theory, espoused by economist Milton Friedman, claims that the demand for prohibited drugs increases because "the forbidden fruit effect of illegalization makes the drugs more attractive, particularly to youth" (Henderson, 1997, p.6).

Because of these offsetting effects, we assume that legalizing drugs causes a forbidden fruit effect that exactly outweighs the enforcement effect.

3. The Market Demand for a Particular Drug is Always Somewhat Elastic, Never Perfectly Inelastic.

This assumption is necessary because a perfectly inelastic demand curve indicates that drug users would continue to demand a set quantity of a drug despite an increase or reduction in the price of the drug. Perfect inelasticity, recall, requires that the income effects and substitution effects are exactly equal, and though theoretically possible, this is highly unlikely. "In fact, economists have never found a good for which demand is perfectly inelastic, including addictive goods like tobacco and alcohol" (Rasmussen and Benson, 1994, p.45). For example, if drugs like heroin—arguably the most addictive drug and, consequently, the most likely to have a perfectly inelastic demand—did have a perfectly inelastic demand, then prohibition would, theoretically, have no effect on consumption, and there would be no loss to consumer's surplus. There is enough evidence, fortunately, to conclude that the demand for drugs is somewhat elastic.

> . . . Kaplan's examination of studies of heroin indicates that there is a striking analogy between alcohol and heroin use. Many heroin [users] . . . voluntarily abstain from use for substantial periods for any number of reasons, just as do problem drinkers. Indeed Moore (1977) and Roumasset and Hadreas (1977) both contend that addicts' behavior exhibits considerable responsiveness to price changes. . . . (Rasmussen and Benson, 1994, pp. 46-47)

4. Different Drugs Have Different Elasticities of Demand That Vary in Different Markets and Must be Estimated for Our Calculations.

As alluded to in the preceding assumption, the elasticity of demand for a particular drug is a determinant in the calculation of the deadweight loss. Studies conducted by Roumasset and Hadreas in 1977, by Silverman and Sprill in the same year, and by Koch and Grupp in 1971 found that the range of elasticity of market demand varied widely from Detroit, MI to Oakland, CA (Rasmussen and Benson, 1994). The demands for most products, presumably including drugs, exhibit both elastic and inelastic ranges. Generally, demand tends to be relatively inelastic when prices are low and elastic when prices are higher. In our estimations, we conduct a sensitivity analysis using a range of elasticities of demand for each drug. Consequently, we present our results as a

range of possible deadweight loss. Though this is less desirable than a single estimation, it should prove to be more accurate and reliable in the end.

E. CHAPTER SUMMARY

We have reviewed the relevant economic principles behind the calculations made in the next chapter. We have defined deadweight loss in legal and illegal markets. Specifically, we have introduced the payment for risk component of deadweight loss and have shown that it is unique to regulated markets. Our goal in the following chapter is to accurately calculate the total value of the deadweight loss and the value of its components for each of four drugs: heroin, cocaine, marijuana, and methamphetamine.

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IV. ESTIMATING THE DEADWEIGHT LOSS

A. INTRODUCTION

In the previous chapter, we explained how the deadweight loss caused by prohibition is comprised of two components. Deadweight loss can also be separated into direct and indirect costs. The direct portion of this loss is represented by the under-consumption of drugs and the payment for risk described in the preceding chapter. Although deadweight loss is widely acknowledged by economists well versed in the intricacies of this policy debate, actual research on the direct component of the deadweight loss is extremely limited. Conversely, the indirect component of prohibition-induced deadweight loss is both widely known and frequently estimated—it was, in fact, estimated to be in the range of $110-160 billion dollars annually, or approximately 1.5% of GDP in the mid-1990s. These expenditures include the costs of incarcerating drug offenders, the healthcare costs of treating drug users, the law enforcement costs of interdiction, and the numerous others costs that have been analyzed repeatedly—usually as evidence that the drug war is failing to achieve its goals. Although this thesis examines both of these cost components, only the direct costs associated with the illicit drug market are thoroughly analyzed and estimated in this chapter.

Cocaine, heroin, marijuana, and methamphetamines are widely recognized as the four most commonly used drugs in America. An analysis of these drugs provides valuable insight into the unique economic forces at work in illicit markets and, more important, provides a realistic estimate of the social loss caused by prohibition. We conduct our analysis for each of the four drugs in four steps. First, using a number of sources, we approximate the global production quantity for each illicit drug and, based on U.S. drug enforcement estimates, estimate the portion of global production of each drug that is consumed in the United States. Second, we determine the actual illegal retail prices for each of these drugs based on past and present studies from both government and non-government sources. Third, we engineer a reasonable legal price for each drug. Finally, we combine these quantities and prices with approximated ranges for elasticities of demand for each drug in order to calculate the quantity that would be demanded in a legal market. Once we have calculated the legal quantity of each drug, we have all the

variables required to estimate a range of deadweight loss caused by the prohibition of these commodities.

B. COCAINE

1. Introduction

The United Nations' Office of Drug Control Policy (UNODCP) estimates that the worldwide market for illicit drugs generates over $400 billion annually. To put this into perspective, the UNODCP estimated in 1997 that the international illicit drug market could equate to more than 8% of the global economy. (Citizen's Commission on U.S. Drug Policy, 1999) The Cadillac of this illicit marketplace is cocaine. The UNODCP estimates that some 180 million people worldwide—4.2 % of people aged 15 years and above—were consuming drugs in the late 1990s; this figure includes 144 million consuming cannabis, 29 million consuming amphetamine-type stimulants, 14 million using cocaine, and 13.5 million using opiates, nine million of whom were addicted to heroin. (*World Drug Report*, 2000) Narrowing these figures down even further, the U.S. Drug Enforcement Administration quoted an October 2001 estimate by the National Household Survey on Drug Abuse that 14.8 million Americans—or 5.4% of the U.S. population and 6.3% of the population over age 12—were current users of illicit drugs in 1999. (*Collective Statistics Concerning Drug Abuse*, 2001, p.1) Furthermore, of the estimated 14 million cocaine users worldwide and 14.8 million illicit drug users in the U.S. mentioned above, the White House's Office of National Drug Control Policy estimates that more than 20%—or 2.9 million cocaine users—are in the United States (490,000 hardcore users and 2.41 million occasional users). (Hozik et al, 2000, p. 10) Despite the widespread prevalence of cocaine use, the list of countries producing large quantities of cocaine is fairly short. In fact, the United Nations' *World Drug Report* 2000 states that only three countries, Bolivia, Columbia, and Peru, qualify as major cocaine producing states. (*World Drug Report*, 2000, p. 29)

2. Quantity of Illicit Cocaine Imported into the United States ($Q_{Illegal}$)

The U.S. Drug Enforcement Administration has designated cocaine a Schedule II narcotic drug. This means that a drug (or other substance) has a high potential for abuse and is currently accepted for medical use, with severe restrictions. Schedule II substances include morphine, PCP, cocaine, methadone, and methamphetamine. (*Schedule II*, 2002)

The fact that only three countries worldwide grow coca plants seems like good news (from the viewpoint of the drug warriors), especially since the total estimated area of coca bush cultivation was only 183,000 hectares in 1999. This means that the total area under coca bush cultivation amounts to just a quarter of the size of Puerto Rico and two to three times the size of cities like New York and Berlin. (*World Drug Report 2000*, p.25) Moreover, even in the main cocaine-producing countries, the total areas under cultivation represent far less than 1% of the arable land. (*World Drug Report 2000*, p.25) Unfortunately, this has not made determining an accepted figure for global cocaine production any easier. The challenge of estimating potential cocaine production is twofold: accurately identifying cultivation areas using digital satellite imagery and estimating the productive efficiency of base processing of cocaine-producing countries. These uncertainties notwithstanding, the UN estimated global coca leaf production in 1999 at approximately 287,000 tons. (*World Dug Report 2000*, p.28)

While conducting this research, we identified a disturbing trend. In searching for the various numbers (e.g., production levels, consumption quantities, seizure amounts, etc.) required for formulating a market analysis, we often encountered conflicting estimates that were based on various and often competing measurement criteria. This is not necessarily surprising, however. Worth mentioning is that, without fail, the figures drawn from U.S. government agencies (e.g., DEA, DoD, DoS, ATF, Bureau of Prisons, etc.) always seemed noticeably skewed in favor of the drug war when compared to the figures gathered from non-drug-war participants. The difference in the estimates for global coca leaf production offers a good example.

The United Nations estimate of global coca leaf production is 286,983 metric tons, while the White House estimate is 230,383 metric tons. (Hozik et al, 2000) The difference between the two estimates—56,600 metric tons—is substantial, especially

considering the seemingly high degree of care the U.S. government takes in calculating the percentage of cocaine it seizes each year. If the U.S. government estimate is understated, then there must be a motive for it—is that motive to provide evidence of success and, thus, a reason to continue the war on drugs? The numbers in this report represent our interpretation of the best estimates currently available, but we warn the reader that all estimates must be viewed with a certain degree of skepticism due to the fact that this market is illegal and consequently, the information available is not as accurate as similar data for legal markets. The United Nations' *Global Illicit Drug Trends* 2000 addressed this point by stating:

> As far as trafficking is concerned, a comparison with the interception rates of opiates in 1998 (17%), makes the interception rate of 46% reported for cocaine for the same year seem extremely high. Assuming a similar volume of seizures in 1999, the rate would be even higher (50%). For the reasons mentioned above, there are thus some doubts about the accuracy of the total potential cocaine production reported during the past few years (765 in 1999). . . . Based on seizure and consumption estimates, UNDCP considers that production might be in fact closer to 1,000 tons. (*Global Illicit Drug Trends,* 2000, p. 32)

The United Nations and the United States government both estimated that worldwide cocaine production was approximately 765 metric tons in 1999. Though it may be quite conservative, we will use this estimate to facilitate our market analysis.

Next, we must ask how much of this cocaine makes its way into the U.S. retail market. In its *Estimation of Cocaine Availability 1996-1999* report, using four different modeling scenarios, the ONDCP concluded that U.S. consumption was approximately 300 metric tons in 1999. (Johnston et al, 2000, p.41) The federal government uses the Sequentional Transition and Reduction (STAR) model developed by Abt Associates to estimate the flow of cocaine between cultivation and retail sale. After accounting for spoilage, loss-in-transit, non-U.S. consumption, and seizure, the STAR model estimated that 276 metric tons of retail-grade cocaine made it into the U.S. market in 1999. (Johnston et al, 2000, p.43) Although there is no truly accurate way to reconcile the differences in these estimates, we will use 276 metric tons to be conservative. This equates to 276,000 kilograms, 276,000,000 grams—approximately one gram of pure cocaine for every man, woman, and child in the United States (based on July 1999 U.S.

Census Bureau estimates). It equates to 95.2 grams of cocaine per estimated user or approximately one gram per user every 3.83 days. Using the English measurement system, these figures convert to 9,742,00 ounces or 3.36 ounces per estimated U.S. cocaine user in 1999. For consistency, this also equates to one ounce for every estimated user every 108.6 days.

These estimates are taken directly from the government's ONDCP report. These authors believe, however, that the government's 276 metric ton estimate of cocaine imported into the United States is too low. This belief is founded on the fact that the Federal-wide Drug Seizure System (FDSS) indicates that the federal government claims to have seized approximately 135 metric tons of cocaine in 1999. (*Drug Trafficking in the United States,* September 2001, p.6) If these figures are accurate, they seem to imply that the U.S. government achieved an interception/seizure rate of almost 33% [because 135 mt equates to 33% of 135 mt+ 276 mt or 411 mt]. Considering the difficulties inherent in drug interdiction, we think this is unlikely. Consequently, the amount reportedly seized by FDSS indicates and supports our belief that the quantity imported into the United States is understated. Figure 4.1 illustrates some of the estimates at the different stages of the STAR model.

3. Price per Ounce of Illicit Cocaine ($P_{Illegal}$)

The price of cocaine represents the second important piece of our analysis. There are as many estimates for the price of illicit cocaine as there are for cultivation, production, seizure, and consumption. For our analysis, we will use the ONDCP base retail price of $149 per pure gram in 1998 constant dollars. (Johnston, Layne, Rhodes, 2000, p.18) This equates to $153 per pure gram in 1999 dollars, based on an average 1999 consumer price index of .97425. This estimate corresponds closely with a number of other studies, most notably The White House ONDCP's *The Price of Illicit Drugs: 1981 through the Second Quarter of 2000.* (p.18) This price figure incorporates the fluctuations in demand patterns and the success of interdiction programs in the different regions of the United States.

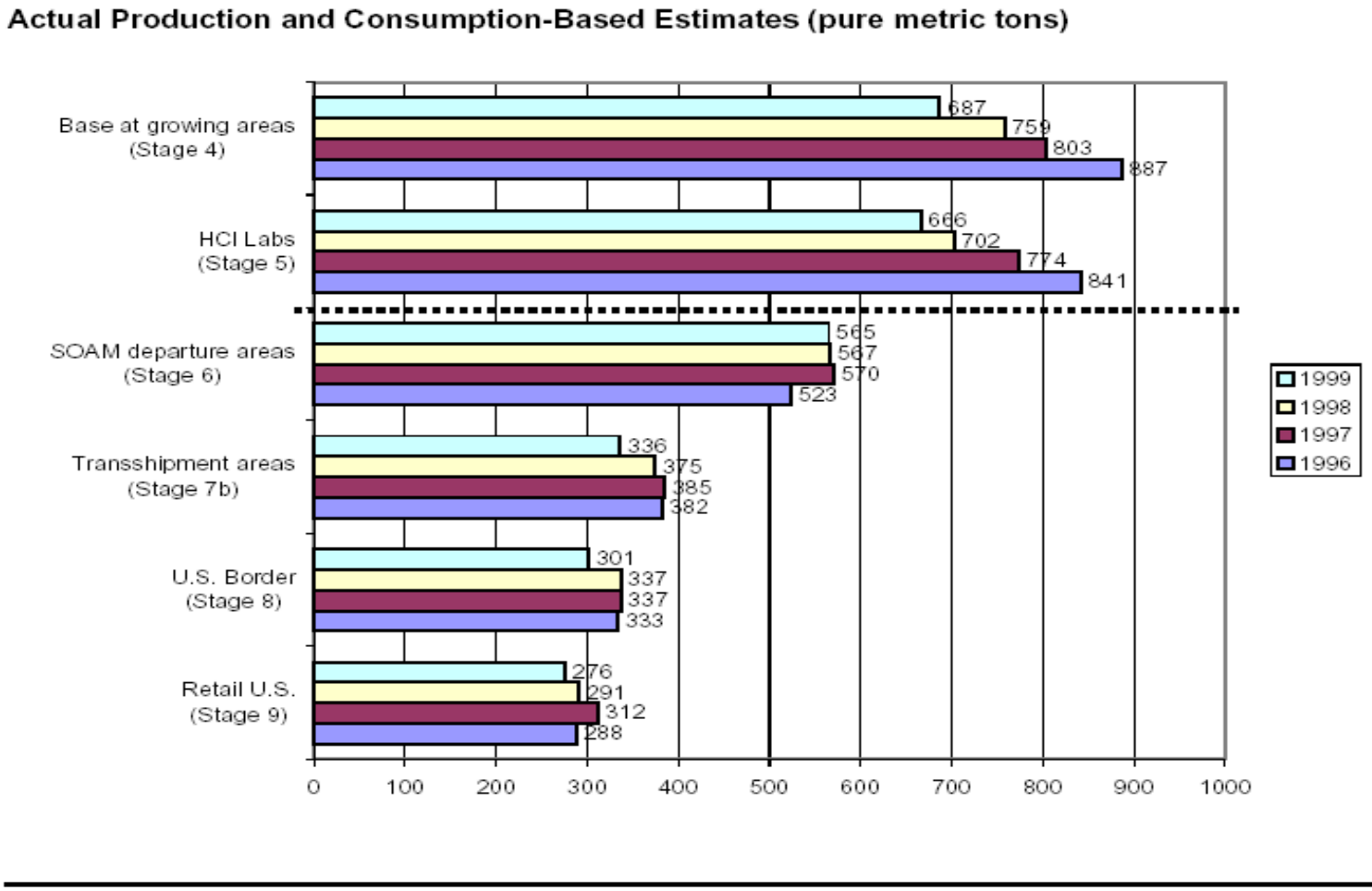

Figure 4.1. From Johnston et al, 2000, p.48.

4. Estimated Legal Price per Gram of Cocaine ($P_{Legal)}$

The vast array of unknown variables within the illicit drug market, the inexact economic data available, and the high level of secrecy surrounding every facet of this industry make estimating a future legal price difficult. Nevertheless, a number of studies have been performed to do just that—predict what a legalized drug market might look like. In his 1991 case for drug legalization, "A Humane Economist's Case For Drug Legalization," David R. Henderson estimates that the retail price of cocaine in 1986 was approximately 37.8 times the equivalent spot market price of cocaine. (Henderson, 1991, p. 658) According to Francisco Thoumi, author of a remarkable and unpublished study of the Andean drug industry, the coca leaf required to produce a kilogram of cocaine cost about $400-600 in 1997. By the time it leaves Columbia en route to subsequent levels of the distribution network, the price increases to $1500-1800 per kilogram. (The Economist, 2001, p.6)

More recent studies estimate that processed cocaine is available in Columbia for $1500 per kilogram and sold on the streets of America for as much as $110,000 a kilogram. (Caulkins et al, 1998, p. 593) Using $1500 per kilogram as a base, the retail price of cocaine in the United States in 1999 was approximately 73.33 times the Colombian price of cocaine (based on the approximate Farmgate prices—$110,000/$1500). Although this type of analysis is helpful in understanding the magnitude of cocaine price mark-ups, a more exact method is needed to derive an estimate for the quantity of cocaine demanded in a legal market.

A good starting point in our analysis is to consider the specific factors used in illicit cocaine production and distribution, to determine which are common to both illicit and legal markets, and then to use that information to estimate the costs of production in a legal market. In 1998, Jonathan P. Caulkins and Peter Reuter developed an excellent analysis and estimate of the cost structure of the cocaine market. This analysis provides what many experts in the field believe to be the most accurate approximation of the cocaine cost structure in an illicit market. Table 4.1 summarizes the results found in *What Price Data Tell Us About Drug* Markets and provides a detailed list of factors to consider and a solid foundation for estimating P_{legal}:

Estimates of the Magnitude of Cost Components for Cocaine Sold at Retail, 1990

Wholesale Price in Colombia	1%
Importing of Drug	12%
Retail Labor	13%
Higher-level Labor	~3%
Drug and Asset Seizures	8-11%
Money Laundering Fees	2-4%
Packaging, Processing, and Inventory Costs	~2%
Compensation for Risk of Prison	23.6%
Compensation for Physical Risk	33%
Total	**~100%**

Table 4.1. From Caulkins et al, 1998, p.8

At a glance, only 31% of these costs components would exist in a legal market. Using this information and an average retail price of $110,000 per kilogram of cocaine, a quick calculation yields $34.10 per pure gram (($110,000 * .31)/1000) versus the current $153 per gram. On the surface, this estimate seems realistic. In fact, a phone conversation with a pharmacist at Salinas Valley Memorial Hospital in Salinas, California confirms this. The pharmacist told us that the hospital could buy five grams of cocaine for as little as $224.09, or roughly $44.82 per gram. (PHONCON, 5 April 2002) This seems to make our $34.10 estimate reasonable. However, this price is from a regulated legal market, not from a free market. Unfortunately, we cannot use $34.10 as our P_{legal} for this analysis because this estimate fails to strip away the risk premiums embedded in each of the remaining cost areas. The risk-associated cost multiplier in each of these areas is impossible to predict accurately due to the limited available data. Thus, each of the remaining production areas (importation, labor, packaging, etc.) is significantly inflated. Consequently, another method of estimating the legal price is needed.

Our first estimate of the legal price of cocaine is from a basic engineering of the production process. We combine the retail price of the required precursor chemicals with

an estimate of the cost of labor and overhead associated with producing and selling the commodity in the U.S. The following excerpt is a synopsis of how cocaine is produced:

> Cocaine hydrochloride, which is cocaine in its powdered form, is primarily produced from the leaves of one of two species of erythroxylon plants—erythroxylon coca or erythroxylon novogranatense—that are found principally in Peru, Bolivia, and Colombia. In one of the most commonly used procedures, coca leaves are pulverized; mixed with an alkaline material (e.g., baking soda), an organic solvent (e.g., kerosene, benzol, or gasoline), and water, and then shaken. The water and leaves are then discarded. An acid (e.g., sulfuric acid) is mixed with the solution to remove residual solvents. Baking soda is added and the mixture is dried, creating a putty-like substance called "coca paste" or "basuco.". . . (*Coca Fact Paper: A Primer*, 2001)

Six chemicals are used to refine cocaine: ammonia, hydrochloric acid, lime, limestone, potassium carbonate, potassium permanganate and sulfuric acid. The four solvents used are acetone, ethanol, ether and kerosene. Given this information and the fact that it takes approximately 210 liters of kerosene or acetone and 50 kilograms of cement/lime to process just one kilo of cocaine, we can make some calculations. We base the remaining estimates on the limited data available in this area. Figure 4.1 illustrates the order of production and quantities of precursor chemicals used in the process. Table 4.2 lists the production factors and their associated costs required to produce one kilogram of cocaine in a legal market.

It takes roughly $840, or $0.84 per gram worth of raw materials, to manufacture one kilogram of cocaine. A number of well-known drug market researchers have also arrived at similar conclusions. For example, Peter Reuter, a professor at the University of Maryland, has supported the surprisingly low figures computed in Table 4.2 a number of times. In 1992, Reuter noted that a gram of cocaine sold as an anesthetic in the legal market for only $4 per gram. (Reuter, 1992, p.37) More recently, in a March 2000 *New York Times* article, he explained that it costs cocaine refiners only 30 cents to purchase the coca leaf needed to produce a gram of cocaine, which sells for about $150 in the United States. (Reuter, 2000) Ian Vasquez, a researcher at the Cato Institute, also reinforces these estimates by arguing that smuggling costs make up only 10% of the final value of cocaine in the United States and that these costs, combined with all other production costs outside of the U.S. account for only 13% of cocaine's retail price.

(Vasquez, 2000, p.582) At this point, it is important to note that we view smuggling and importation as being basically equal, although smuggling is the importation of an illegal commodity. That said, we considered smuggling and importation costs to represent the

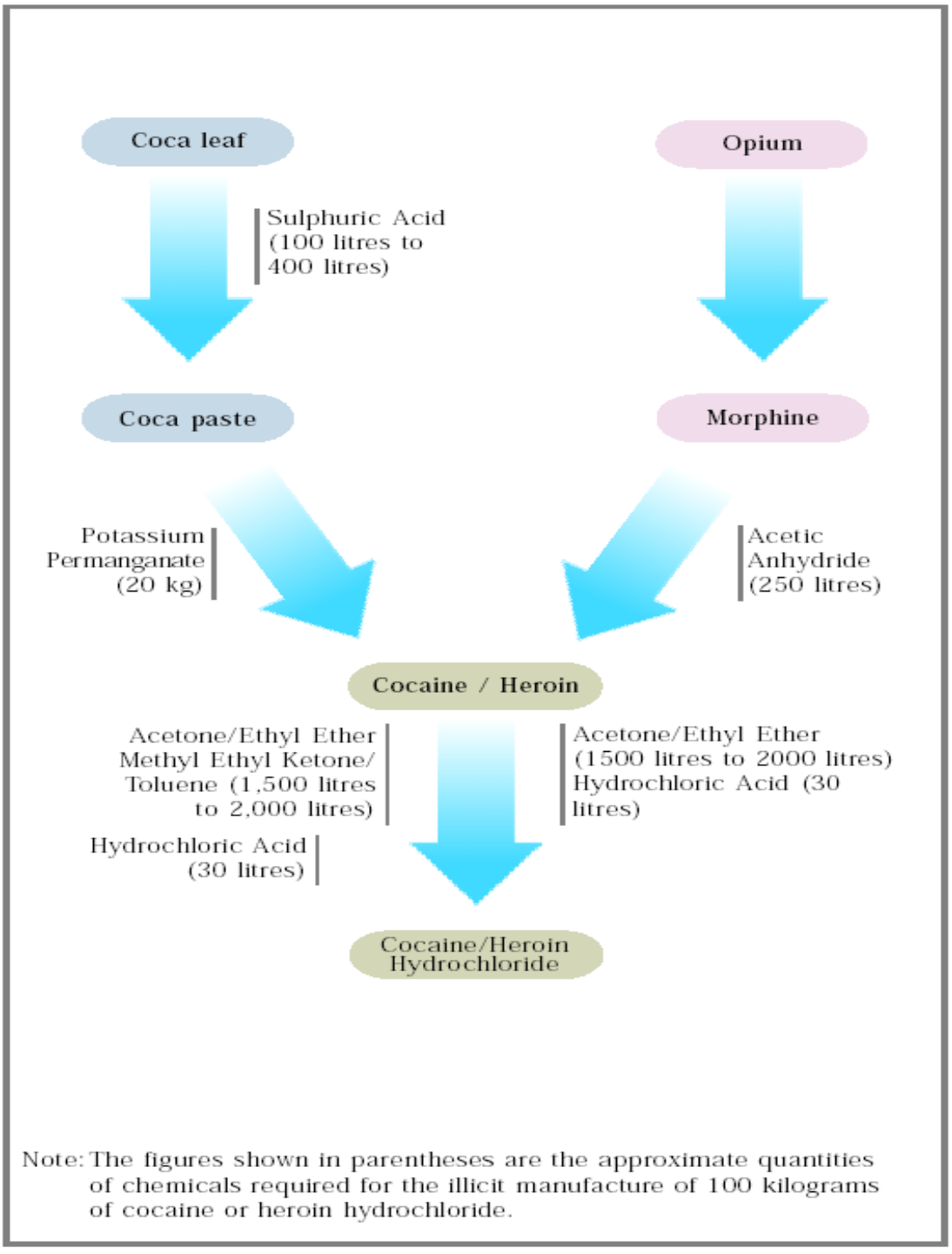

Figure 4.2. From *Chemicals Required for the Illicit Manufacture of Drugs,* 2000, [p.15]

Raw Material	FY 1999 (Dollars)
300 kg of Coca Leaves	$450.00
1 kg of coca leaves = $1.50/kg in Bolivia (Farmgate)	
Kerosene	$59.00
55.5 gallons x $1.07 = $59.00	
Cement…(frequently used as a substitute for lime)	$4.00
$80 per ton in 1999	
.2 kg Potassium Carbonate	$7.42
1 kg = $37.08	
0.2 kg Potassium Permanagate	$1.36
5 kg = $340.00	
4.5 L Acetone	$85.32
1 Liter = $ 18.96	
4.5 L Ethanol	$118.80
1 Liter = $26.40	
4.5 L Toluene	$79.92
1 Liter = $17.76	
2 L Sulphuric Acid (virgin)	$28.80
1 L = $14.40	
.3 L Hydrochloric Acid	$4.32
1 L = $14.40	
4.5 L Ammonia	$0.37
$125 per ton	
TOTAL	$839.31

Table 4.2. Engineering the Legal Price of Cocaine: Raw Materials Cost After *Global Illicit Drug Trends*, 1999

same expenses. This is significant because it reinforces the assumptions and subsequent analysis we performed when looking at the percentages in table 4.1. Specifically, if we compare Vasquez' 13 percent estimate to our estimate in the previous table, they are identical. In Table 4.1, the wholesale price of cocaine [1%] and the importation costs [12%] combine to equal 13% of the final price just as Vasquez argues in his study.

Using Vasquez's estimates for these costs, the legal price for cocaine is approximately $0.95 per gram. Jonathan P. Caulkins, a Carnegie-Mellon professor and RAND Drug Policy Center research fellow, effectively summarizes these arguments and supports these estimates in the following excerpt:

> If cocaine were legalized, there would be little to stop individuals from ordering a kilogram of cocaine powder from Colombia (cost $1,500), having it shipped to the U.S. (FedEx delivers kilogram parcels overnight for $44), and dividing it up into bags and selling it at retail. Selling "eight-balls" (one-eighth ounce packages) for $10 would give the seller a 100% markup, but still provide cocaine to customers at $3/gram—about 3% of the current price. Sellers could double their money in a few days, and the only labor involved in "processing" the cocaine would be dividing the kilogram of cocaine into about 300 small bags. Even without any equipment that would take at most a few hours. (It is about as labor intensive as folding papers and stuffing envelopes for a mass mailing.) The "eight-balls" could be mailed to customers for $0.33 per letter—adding just $0.10/gram or so to the cost. (Caulkins, 2000)

Caulkins also adds that the business costs of operating in this manner are roughly:

1. Raw material cost:	$1.50 per gram
2. Shipping (receiving):	$44/kg = $0.04 per gram
3. Shipping (outgoing):	$0.33 per 3.5 grams ($0.09/gram)
4. Packaging (baggies):	$14 per 1,000 lot is < $0.01 per gram
5. Packing (envelopes, mailing labels, etc.):	$0.05/ envelope ($0.01 – $0.02/gram)
6. Labor (4 hours per kilogram @ $20/hour):	$0.08 per gram

Caulkins suggests that with production costs below $2 per gram, even without automation in billing or packaging, one could net over $1,000 per week for only four hours of work. The unincorporated individual just described would have sales of $150,000 and profits of about $65,000 per year, roughly triple what a typical street seller of cocaine has now, while working just four hours per week. (Caulkins, 2000)

Getting back to our estimate, we conservatively estimate labor costs at 150% of the raw materials costs. Adding that the to the total, the production costs are now $2,098.28 per kilogram. Assuming further that the overhead costs are 100% of the raw materials cost, the final cost of one kilogram of cocaine is $2,937.59, or approximately $2.94 per gram—1/52nd of the illegal market price.

The overhead costs are more than reasonable given that Federal Express would charge only around $44 to deliver a kilo of something legal from Bogotá to Miami, rather than the estimated $10,000 transportation fee for the same illegal activity. In an attempt to verify the reasonable validity of these assumptions, we contacted the Drug Enforcement Administration (DEA), along with the only companies that are currently registered and approved by the DEA to distribute cocaine. High Standard Products, Sigma-Aldrich, Stepan Inc., and Mallinckrodt Inc. all maintain current registrations to manufacture cocaine. What we learned was very interesting.

The DEA maintains a de facto monopoly on the legal sale and distribution of all scheduled drugs, which, in itself, is not surprising. What is surprising is that the DEA's Office of Diversion Control maintains aggregate production quotas for each of its scheduled drugs. In 1999, the DEA authorized or managed the distribution of 251 kilograms of "legal" cocaine, no heroin, no marijuana (although over 350 kilos of marijuana were authorized in 2000), and 166 kilograms of methamphetamines for the U.S. "research" market. (DEA, Office of Diversion Control, 2002) Of further interest is that these "legal" drugs, distributed in a highly regulated market, are priced higher than the prohibition price. To illustrate this point, High Standard Products sells five milligrams of cocaine (considered a bulk purchase) for $300. (*Catalog of Reagents and Test Kits for Drug Testing*, 2001, p. 10) This equates to $60,000 per gram—$6 million per kilogram. Discussions with two of the four companies revealed that they do not actually produce these drugs, but—although they would not "officially" confirm this—only purchase and

re-distribute these drugs, despite being listed in the Federal Register as "bulk manufacturers." (Federal Register Online, 2002, pp. 51969-51970) In fact, a contact at Sigma-Aldrich, who asked not to be identified, stated that the company buys its supply of drugs from the DEA's confiscated drug seizures and, after testing it for purity, re-packages, and distributes it—all at a very minimal profit markup.

This markup covers the "excessive" costs of adhering to the FDA's stringent standards. (Phone conversation, 2 April 2002) In an effort to verify this claim, we contacted the DEA's San Francisco Diversion Control field office and the Diversion Control Headquarters in Arlington, Virginia. Agents at both sites adamantly denied the claim made by the Sigma representative, adding that the DEA immediately destroys all seized drugs and acts strictly as an oversight authority for the legal production of these drugs. (Phone conversation between Marvin McGuire and Carolyn Jones, 5 April 2002, 1140 hrs)

Considering the difficulty in arriving at a verifiable answer and the unpredictable dynamics of the illicit drug market, the preceding assumptions and the subsequent P_{legal} estimate seem reasonable. The magnitude of our estimate is also supported by other economic research in this area. For example, further research performed by Caulkins estimates that, in a legal regime, cocaine might retail for as little as $5 a gram. (Reuter, 2001, p.22) Taken together, all of these factors indicate that our estimate for a legal price of cocaine can be considered realistic.

As a final step, we used cigarettes as a foundation to formulate the potential profit margin for legal drugs. Since cigarettes contain the addictive drug nicotine, they provide the most realistic and relevant starting point for our estimate. In November 1999, the average wholesale, pre-tax price per pack of cigarettes was $1.88. (Economic Resource Service, U.S. Department of Agriculture, Tobacco Briefing Room, www.ers.usda.gov/Briefing/tobacco; and Orzechowski & Walker, *The Tax burden on Tobacco (2001)*, 2001) The published contribution margin for the cigarette industry in 1997 was 34%. Applying this margin to the total cost we've calculated thus far yields a legal price (P_{legal}) of $3.94 per gram of pure cocaine. This incredibly low estimate illustrates one very important point: prohibition introduces unnecessary risk into the

market and results in extremely inflated market prices. Ultimately, this risk premium creates economic inefficiency and social loss.

5. Estimating the Legal Quantity ($Q_{legal,}$) Using Elasticity of Demand

There is simply no direct method available for calculating the quantity of drugs that would be demanded under legalization. 70 years or so of prohibition has caused nearly zero marketing data available for analysis. Accordingly, we are forced to derive these quantities using the price elasticity of demand for each drug.

Elasticity is a measure of sensitivity of one variable to another. Price elasticity of demand measures the sensitivity of the quantity demanded to a change in price. It defines the percent change in the quantity demanded for a good as a result of a one percent increase or decrease in the price of that good. This is important to our analysis because it allows us to estimate the approximate change in consumption quantity for cocaine, given a calculated percentage reduction in price. For example, in the section above, we attempted to formulate a realistic legal price for cocaine. Using that estimate, we can use the price elasticity of demand for cocaine to arrive at an approximation for the quantity demanded at that specific price and demand elasticity. By using a range of realistic price elasticities for cocaine, we can calculate a range of potential demand/consumption quantities under a legalized system. Let us denote quantity and price by Q and P, to give us the expression for price elasticity of demand.

$$\eta = (\Delta Q / Q) / (\Delta P / P)$$

The following are the most widely cited and readily accepted estimations for the demand elasticity for cocaine:

-0.5 (Everingham and Rydell, 1994, p. 34)

-0.28 (Saffer and Chaloupka, 1999, p. 27)

-0.70 to –1.70 (Chaloupka and Grossman, 1998)

-0.36 w/ range of –0.51 to -0.23 (Caulkins, 1995, p.18)

Using a range of demand elasticities from –0.23 to –1.70 will result in a range of potential consumption quantities in a legal market.

Before performing this analysis, it is important to note that we used the point elasticity of demand rather than the arc elasticity of demand to calculate these quantities even though arc elasticity seems to be the more appropriate method based on the large difference in drug prices between legal and illegal drug markets. For small changes in price and quantity, the difference between the two results is often negligible, but for large changes—as is the case with illegal and legal drug prices—the difference may be more significant. To deal with this issue, one can define the *arc* price elasticity of demand. The arc elasticity uses the average of the initial and final quantities and the average of the initial and final prices when calculating the proportionate change in each. Mathematically, the arc price elasticity of demand is defined as:

$$\eta = \frac{\left[\dfrac{(Q_L - Q_I)}{(Q_L + Q_I)/2}\right]}{\left[\dfrac{(P_L - P_I)}{(P_L - P_I)/2}\right]}$$

where the entire equation is preceded by a negative sign and

Q_I = Illegal quantity
Q_L = Legal quantity
P_I = Illegal price
P_L = Legal price

Solving for Q_L,

Let, Then,

$$\rho = \left[\frac{(P_L - P_I)}{(P_L - P_I)/2} \right] \qquad Q_L = Q_I * \left[\frac{(1 - \rho\eta)}{(1 + \rho\eta)} \right]$$

Unfortunately, as we discovered, the arc price elasticity equation is unreliable in determining Q_L for a very small, but critical range of elasticities. We discovered this limitation while calculating the legal quantities for heroin. We took an average of the reported range of elasticities of demand for heroin (a crude but reasonable method to arrive at a reasonable estimate) and the result was –1.015. Using this elasticity and our estimates for the illegal price and quantity and the legal price of heroin, we discovered that the resulting legal quantity was on an order of two magnitudes higher than the result obtained using an elasticity of –1.09. Further analysis proved that the product of the price factor (ρ) and the elasticity of demand (η) in this particular calculation was incidentally very close to –1. This caused the equation to "blow up" because at ($\rho * \eta$) equal to –1, the denominator equals zero and the results are undefined. We were quite lucky to discover this problem with the arc price elasticity equation. It was only by chance that the product of the price factor and the average elasticity approximated –1. Left with little alternative, we used the point elasticity of demand for our estimation. The equation is illustrated below.

$$\eta = \frac{\left[\frac{(Q_L - Q_I)}{Q_I} \right]}{\left[\frac{(P_L - P_I)}{P_I} \right]}$$

where the entire equation is preceded by a negative sign and

Q_I = Illegal quantity P_I = Illegal price
Q_L = Legal quantity P_L = Legal price

The table on the following page confirms one simple yet very important thing about cocaine. It is, ultimately, a normal consumer good that is sensitive to price changes—how America imposes these price changes is what is at issue in this paper. These data support two notions: legalization would increase the amount of cocaine in the U.S. marketplace by between 122 and 265 percent, depending on the elasticity assumed (range 337.85 - 733.12 metric tons), as the laws of supply and demand dictate; and, at the same time, it would drastically reduce the deadweight loss associated with America's current war on drugs.

Cocaine

Elasticity of Demand (η)	Prohibition Quantity ($Q_{illegal\text{-}GRAMS}$)	Legal Price	Prohibition Price	Price Factor	Legal Quantity ($Q_{legal\text{-}GRAMS}$)	(Q_{legal}) Metric Tons
-1.7	276,000,000	$3.94	$153	($0.97)	733,117,333	733.12
-1.5	276,000,000	$3.94	$153	($0.97)	679,338,824	679.34
-1.25	276,000,000	$3.94	$153	($0.97)	612,115,686	612.12
-1	276,000,000	$3.94	$153	($0.97)	544,892,549	544.89
-0.7	276,000,000	$3.94	$153	($0.97)	464,224,784	464.22
-0.51	276,000,000	$3.94	$153	($0.97)	413,135,200	413.14
-0.5	276,000,000	$3.94	$153	($0.97)	410,446,275	410.45
-0.36	276,000,000	$3.94	$153	($0.97)	372,801,318	372.80
-0.28	276,000,000	$3.94	$153	($0.97)	351,289,914	351.29
-0.23	276,000,000	$3.94	$153	($0.97)	337,845,286	337.85

Table 4.3. Calculating the Legal Quantity for Cocaine

6. Conclusion: Deadweight Loss from Cocaine

The calculation of the deadweight loss boils down to basic economics. Specifically, in this analysis of the cocaine market, price x quantity demanded equals total cocaine revenue or approximately $42.228 billion. This is important because it gives us an idea of the magnitude of the cocaine market and further defines the boundaries of the deadweight loss calculation. Estimating the deadweight loss for cocaine entails calculating both the "payment for risk" (i.e., the difference between $P_{illegal}$ and P_{legal} multiplied figure by $Q_{illegal}$) and the "underconsumption" portion (i.e., one-half multiplied by the difference between Q_{legal} and $Q_{illegal}$ multiplied by the difference between P_{legal} and $P_{illegal}$) of the deadweight.

Using the figures derived earlier, we can calculate each cost component. The resulting estimates are contained in the Table 4.4.

Cocaine

Elasticity of Demand (η)	Deadweight Loss Payment for Risk	Deadweight Loss Underconsumption	Total DWL $
-1.7	$41,140,560,000	$34,068,954,853	$75,209,514,853
-1.5	$41,140,560,000	$30,060,842,518	$71,201,402,518
-1.25	$41,140,560,000	$25,050,702,098	$66,191,262,098
-1	$41,140,560,000	$20,040,561,678	$61,181,121,678
-0.7	$41,140,560,000	$14,028,393,175	$55,168,953,175
-0.51	$41,140,560,000	$10,220,686,456	$51,361,246,456
-0.5	$41,140,560,000	$10,020,280,839	$51,160,840,839
-0.36	$41,140,560,000	$7,214,602,204	$48,355,162,204
-0.28	$41,140,560,000	$5,611,357,270	$46,751,917,270
-0.23	$41,140,560,000	$4,609,329,186	$45,749,889,186

Table 4.4. Calculating the Deadweight Loss From Cocaine

The numbers are huge, more than likely because of the unrealistically high elasticity of demand on which some of these estimates are founded. That point should not be overlooked when considering these results. The point is that all of the elasticity estimates above are calculated with fairly unreliable data—a problem that will always exist in an illegal market—and are based on a relatively narrow range of prices. Outside that range—and a 95% price drop is definitely outside that range—we just don't know. That's where common sense comes in. Would the amount consumed really go up 3 times if drugs were legalized? If the U.S. experience with prohibition is any indication, the answer is a resounding "No."

That said, after adding these cost components together, we arrive at a range of estimated DWL between $45.7 and $75.2 billion, depending on the elasticity assumption used. Not surprisingly, these estimates tell us that the "payment for risk" portion of the DWL is, by far, the largest cost factor in the cocaine market. The calculation and numbers seem to indicate that if cocaine were legalized, more Americans would potentially use it but society would still be better off because the "payment for risk" portion of the DWL would be eliminated. What is even more difficult to consider is the

fact that as more Americans consume cocaine the "underconsumption" portion of the DWL would also decrease. Despite this, we did not try to balance the possible cost increases against the reduction of DWL in a legalized market. We offer these comments only for consideration.

Does this mean that prohibition is working? All of this is totally dependent on the "assumed" elasticity used in the estimation. Using the average of the elasticities in this range results in an average elasticity of -.803. This equates to a DWL of $57.2 billion. These figures support the conclusion that the "payment for risk" component of the deadweight loss, and not the "underconsumption," is the real driving factor behind the DWL caused by prohibition.

Given the difficulty of determining or even estimating the "rents" that criminals earn in return for their "criminal skills," we arbitrarily estimated it in Chapter III at 5% of the "payment for risk" component—area B in the graph on page 28. This 5% equals more than $2.058 billion in 1999. Subtracting the rents portion of the market from the payment for risk reveals that it is very expensive to operate in an illegal environment. In effect, it cost cocaine dealers over $39 billion in 1999 to do business in the American cocaine market.

C. HEROIN

1. Introduction

Recognizing that the analysis of the global or the U.S. heroin market is plagued by the same uncertainties as the previous cocaine analysis, this section will attempt to capture only the unique nuances of the heroin markets. Of the thirteen-and-a-half million people worldwide who use opiates, nine million are addicted to heroin. (*World Drug Report*, 2000, p.29) While these figures are similar to the estimates of global cocaine use, the heroin market differs in other ways. This is particularly true in the United States. For example, while 35% of worldwide cocaine production is destined for the United States, less than 5% of global heroin production makes its way to the U.S. market. (*World Drug Report*, 2000, p.36) The United Nations estimated that the global opium harvest was over 5,800 tons in 1999, more than the 4,900-ton average between 1994 and 1999. (*World Drug Report*, 2000, p.23) In 1999, the total hectares under opium poppy

cultivation were estimated at 217,204. (*World Drug Report*, 2000, p.23) Even more surprising is that global opium production is also concentrated in only four geographic areas, with the greatest concentrations in two countries, Afghanistan and Myanmar (formerly Burma). (*World Drug Report*, 2000, p. 27) The four major source areas for heroin production are: 1) South America (Columbia); 2) Southeast Asia (principally Myanmar); 3) Mexico; and 4) Southwest Asia/Middle East (Turkey, Pakistan, Afghanistan, and Lebanon). (DEA, 1999, p.4) Each of the four major producing areas has dominated the U.S. market at some point over the last 30 years as U.S. enforcement priorities and methods have shifted. This phenomenon is frequently referred to as the "push-down pop-up theory" of drug control—the U.S. illicit drug market perfectly exemplifies this economic occurrence.

Of the four heroin-producing areas, Afghanistan and Myanmar account for almost 85% of global production. According to the United Nations' report *Global Illicit Drug Trends 2000*, Afghanistan accounts for over 42% of the global illicit poppy cultivation areas, Myanmar approximately 41%, Laos, Thailand, and Pakistan 13%, and Columbia and Mexico 4%. (*Global Illicit Drug Trends 2000*, 2000, p. 28)

The UN estimates that 1999 global opium production amounted to approximately 578 metric tons, or about 2.66 kilograms of heroin, per cultivated hectare worldwide. (UNDCCP, 2000, p.36) Despite being useful for developing a big-picture view of the heroin market, this measurement does not adjust for the drastically different yield ratios that the different source areas are able to achieve. It simply illustrates global heroin production capacities. We will use 578 tons as our estimate for global heroin production in 1999.

2. Quantity of Illicit Heroin Imported into the United States ($Q_{Illegal}$)

Earlier we stated that only 5 percent of the estimated global heroin supply makes its way into the U.S. market. And 5 percent amounts to 28.9 metric tons of heroin in 1999. However, as discussed when analyzing the cocaine market, most U.S. government estimates use questionable assumptions and are consequently lower when compared against outside estimates. For example, ONDCP's report, *What American Users Spend on Illegal Drugs 1988-1998*, estimates that there were 1.46 million (977,000 hardcore and 484,000 occasional) heroin users in the U.S. in 1999. (Hozik et al, 2000, p.10) Given that the UN estimates that there are approximately 9 million heroin users worldwide, that would mean that approximately 16.2 percent of the world's heroin users reside in America. This would also seem to imply, according to the Office of National Drug Control Policy's estimation, that approximately one-sixth of the world's heroin-using population subsists off of less than 5 percent of world supply— based on the assumption of 28.9 tons of heroin in the U.S. market. However, the ONDCP policy estimates that figure to be somewhere between 12-13 metric tons for 1999 or 2.2 percent of global heroin production. (Hozik et al, 2000, p.46)

Another arm of the federal government, specifically the intelligence community, publishes an entirely different estimate as evidenced in the National Drug Intelligence Center's Interagency Domestic Heroin Threat Assessment dated February 2000. It estimates [using consumption-based equations] the U.S. market to be approximately 18 metric tons. (*Interagency Domestic Heroin Threat Assessment*, 2000, p.1) These estimates highlight some significant disparities. The 12-13 ton estimate would mean that each user would consume on average (12.5 metric tons = 12,5000,000 grams /1,460,000 heroin users) 8.56 grams or 8560 milligrams annually. Although the ONDCP challenges the validity of using the 50 mg per day dosage assumption made by the intelligence community, calling it "shaky and unverifiable." (Hozik, Johnston, Layne, and Rhodes, 2000, p.48), it still provides an effective analytical tool when examining these differences. Simple math tells us that 8560 mg/365 days equals 23.45 milligrams per day or less than half of what the intelligence community states is the norm.

Deciding which group to use in the consumption-based equations presents another problem with the federal government estimates. The ONDCP report uses all heroin users (1.46 million) in formulating its estimate while the NDIC estimate uses only the hardcore heroin addicts (977,000), NDIC estimates that 75 percent of all heroin is consumed by hardcore addicts. The 50 mg per day dosage assumption, combined with the entire heroin-user population, results in an estimate of 26.65 metric tons annually – much closer to the 28.9 metric tons or 5 percent of global production estimate made above.

Examining some research into heroin consumption among hardcore addicts sheds light on the validity of these two government estimates. Howard Lotsof, a renowned researcher of heroin addiction treatment, has estimated that most users start with heroin doses range between 5-20 mg per day depending on how the drug is administered. (*The Vaults of Erowid: Notes on Heroin Dosage & Tolerance*, 2001) In the most anticipated study of the treatment of heroin addiction, Switzerland began allowing the maintenance of heroin users in January 1994. Published in 1999, the Swiss data is the best currently available about maximum daily heroin dosages when humans are given virtually unlimited access to the drug. The Swiss report states that the mean daily dose of heroin (when used alone- i.e., without methadone) was 491.7 milligrams. (Uchtenhagen et al, 1999, p. 20) The Swiss report goes on to say that the ratio between single-dose initial dosages (i.e., no tolerance) to daily ingestion amounts for long-term users (high tolerance) dosages is mush less than 1 to 100 but probably somewhere in between. (Uchtenhagen et al, 1999) Using the Swiss data, let's assume that the ratio mentioned above is only 1 to 20 for hardcore users and 1 to 5 for occasional users. That would equate to 100 mg per day for hardcore users (based on an initial dose of 5 mg per day) and 25 mg per day for occasional heroin users (significantly below the NDIC estimate). Extrapolating these dosages out using the U.S. heroin user population in 1999 (977K addicts and 484K occasional users) results in an estimate of 40.07 metric tons of heroin in the U.S. market. This certainly puts the White House and the Intelligence Community estimates in question.

Despite all of the uncertainty surrounding the ONDCP estimates expressed above and to maintain our conservative approach in this analysis, we will use this 12.5 metric tons as the quantity of heroin entering the U.S. illicit drug market in 1999.

3. Estimating the Price per Ounce of Illicit Heroin ($P_{Illegal}$)

Like cocaine, there are many estimates for the illicit price of heroin. However, to remain consistent throughout this research, we will use the ONDCP base retail price of $1056 per pure gram in 1999 dollars. (Johnston et al, 2000, p.18) This estimate also corresponds closely with the ONDCP's *The Price of Illicit Drugs: 1981 through the Second Quarter of 2000.* The retail price of heroin is astounding, even when compared to the price of cocaine. In fact, the DEA estimated that a kilogram of heroin sold for between $50,000 and $200,000, depending on the source area and retail market. (*Drug Trafficking in the United States – September 1999*, 1999, p.6) These price magnitudes were confirmed again by DEA reports in February and September 2001. In its February 2001 Drug Intelligence Brief, the DEA effectively distills the incredible price multiplier at work in the retail market for Southeast Asian heroin:

> After being cut and resold on the street for $10 in 50-milligram dime bags, a 700-gram unit of Southeast Asian heroin will generate $280,000 in sales. . . . Typically, a 700-gram unit of Southeast Asian heroin is mixed with an equal amount of adulterants, usually lactose, resulting in a dry, white powder mix, which weighs approximately 1400 grams. This amount of powder can make about 28,000 50-milligram bags, each bag containing a mixture of 25 milligrams of heroin and 25 milligrams of adulterant, which are routinely analyzed at 50 percent purity. (*The Price Dynamics of Southeast Asian Heroin, February 2001,* 2001*,* p.7)

Considering this, $1056 per pure gram in 1999 seems a very reasonable estimate for the illegal price of heroin.

4. Estimating the Legal Price per Gram of Heroin (P_{Legal})

In the absence of more scientifically advanced methods of predicting the price of heroin in a legal market environment, we will engineer the price using the same methodology we used for cocaine. Before doing so, let us briefly examine how heroin is made.

Illicit heroin is manufactured using the following basic steps: 1) morphine base is extracted from the harvested opium; 2) morphine base is converted to heroin base; and, finally, 3) heroin base is converted to water-soluble heroin hydrochloride. The manufacture of one kilogram of heroin requires ten kilograms of opium and 20 kilograms

of other substances. (*Chemicals Required for the Illicit Manufacture of Drugs*, 2000, p.13) As with cocaine, a variety of precursor chemicals is required to effectively manufacture heroin. Table 4.5 lists these chemicals, their quantities, and their prices. If we make the same assumptions that we did for cocaine—that is, the labor costs are 150% of the raw materials costs, and the transportation, distribution, and final market costs are on the magnitude of 100% of the raw materials costs—then the final cost of one kilogram of heroin would be $6,344.38, or approximately $6.34 per gram—$1/166^{th}$ of the illegal market price.

These assumptions are reasonable, considering that the fee for smuggling heroin from Bangkok to New York can go as high as $5,000 to $10,000 per 700-gram unit. (*The Price Dynamics of Southeast Asian Heroin*, 2001, p. 6) Applying a 34% contribution margin, we arrived at a P_{legal} for heroin of $8.49 per gram. This seems to be fairly realistic when compared against the prices charged during the most extensive heroin study performed to date. The Swiss government charged the participants in their now-famous 1994 heroin experiment only 15 francs, or approximately $13 (or $14.68 in 1999 adjusted dollars), per day for a virtually unlimited supply of heroin. (Nadelmann, Ethan A., "Switzerland's Heroin Experiment," *National Review* 10 July 1995, pp.46-47)

Using this information as a baseline to examine our estimate of P_{legal} for heroin proves to be very useful. As stated above, the average daily dosage for heroin addicts in the Swiss experiment was 491.7 milligrams. Using our estimate of $8.49 per gram would mean that each participant in the program consumed only $4.17 worth of heroin each day. Considering this, a $14.68 per day charge would quite possibly cover the cost of the heroin used and at least a portion of the overhead required to administer the program.

Quantity of Raw Material	FY 1999 (dollars)
10 kg of Opium	$1669.16
1 kg of opium = $166.92 (weighted average using source country production levels - 1999Farmgate)	
2 kg Calcium Hydroxide (slaked lime)	$82.20
1 kg= $41.10	
2.5 L acetic Anhydride	$126.00
(Critically important and internationally controlled as heroin precursor)	
1 L = $50.40	
2.5 kg Ammonium Chloride	$129.45
1 kg = $51.78	
1 L Sulphuric Acid or Hydrochloric Acid	$14.40
1 L = $14.40	
2.2 kg Sodium Carbonate	$101.20
1 kg = $46.00	
6.6 L Ethyl Alcohol	$174.50
1 L = $26.44	
6.6 L Ether	$237.60
1 L = $36.00	
225 ml Concentrated Hydrochloric Acid	$3.24
1 L = $14.40	
TOTAL	$2,537.75

Table 4.5. Engineering the Legal Price of Heroin: Raw Materials Cost(Source: Bacto Laboratories Pty Ltd, Liverpool NSW Australia, 310-312 Elizabeth Drive, Liverpool, NSW, Australia 2, http://www.bacto.com.au/, last updated 2001; UNDCP *Global Illicit Drug Trends*, 1999; New York U.S. Geological Survey, Mineral Commodity Summaries, January 1999; and http://www.chemexpo.com/news/PROFILE991122.cfm)

5. Estimating the Legal Price of Heroin Using Elasticity of Demand

The following are the most widely cited and readily accepted estimations for the demand elasticity for heroin:

-0.94 (Chaloupka and Saffer, 1999, pp.27)

-0.82 (Chaloupka and Saffer, 1997)

-1.00 (Van Ours, J.C., 1995, pp.261-279)

-1.23 (Bretteville-Jensen and Sutton, 1996)

-0.27 (Silverman and Spruill, 1977; Brown and Silverman, 1974)

-1.83 (Chaloupka and Saffer, 1995)

Using a range of demand elasticities from –0.27 to –1.83 will result in a range of potential consumption quantities in a legal market and help to further develop this analysis of the illicit drug market. Table 4.6 displays the legal quantities (in grams and metric tons) of heroin demanded by consumers based on a range of demand elasticities.

As in the cocaine analysis, these calculations paint a controversial picture. Legalizing heroin would drastically reduce its retail price (to less than 1% of its current illegal retail price) and significantly increase the amount of heroin available in America. Specifically, these estimates conclude that legalization would increase the amount of heroin in the U.S. marketplace from current annual estimates of 12-13 metric tons to 15.85 – 35.19 metric tons (a potential 126 –281% increase, depending on the price elasticity used). However, as we discuss below, it would also drastically reduce the deadweight loss associated with America's current war on drugs.

Heroin

Elasticity of Demand (η)	Prohibition Quantity ($Q_{illegal\text{-}GRAMS}$)	Legal Price	Prohibition Price	Price Factor	Legal Quantity Grams	Legal Quantity Metric Tons
-1.83	12,500,000	$8.49	$1,056	($0.99)	35,191,090	35.19
-1.75	12,500,000	$8.49	$1,056	($0.99)	34,199,130	34.20
-1.5	12,500,000	$8.49	$1,056	($0.99)	31,099,254	31.10
-1.23	12,500,000	$8.49	$1,056	($0.99)	27,751,388	27.75
-1	12,500,000	$8.49	$1,056	($0.99)	24,899,503	24.90
-0.94	12,500,000	$8.49	$1,056	($0.99)	24,155,533	24.16
-0.82	12,500,000	$8.49	$1,056	($0.99)	22,667,592	22.67
-0.27	12,500,000	$8.49	$1,056	($0.99)	15,847,866	15.85

Table 4.6. Calculating the Legal Quantity of Heroin

6. Conclusion: Deadweight loss from Heroin

The deadweight loss resulting from the illicit heroin market is between $14.8 and $24.9 billion (the elasticity assumption is critical). In order to remain consistent, we recall that in Chapter III, we arbitrarily estimated the "rent" portion of the deadweight loss at 5% of area B. This 5% equals more than $654 million in 1999. Subtracting the rents portion of the market from the payment for risk reveals that it is very expensive to operate in an illegal environment. In effect, it cost heroin dealers over $12.43 billion in 1999 to do business in the American heroin market. Table 4.7 lists the total deadweight loss resulting from the regulation of heroin for a range of demand elasticities. As well, it breaks the total deadweight loss into it two components, payment for risk and under consumption. Note the changes in the proportion of the total of these two components as demand for heroin becomes more or less elastic.

Heroin

Elasticity of Demand (η)	Deadweight Loss Payment for Risk	Deadweight Loss Underconsumption	Total Deadweight Loss FY1999$
-1.83	$13,087,625,018	$11,884,571,947	$24,972,196,965
-1.75	$13,087,625,017	$11,365,027,818	$24,452,652,835
-1.5	$13,087,625,016	$9,741,452,416	$22,829,077,431
-1.23	$13,087,625,014	$7,987,990,981	$21,075,615,995
-1	$13,087,625,012	$6,494,301,610	$19,581,926,623
-0.94	$13,087,625,012	$6,104,643,514	$19,192,268,526
-0.82	$13,087,625,011	$5,325,327,321	$18,412,952,332
-0.27	$13,087,625,008	$1,753,461,435	$14,841,086,443

Table 4.7. Calculating the Deadweight Loss From Heroin

In an effort to narrow the enormous ranges of quantities and DWL discussed above, we calculated the average elasticity from the range and used it to estimate a point value for the areas we are analyzing. All of this resulted in an average elasticity of –1.1675, a DWL of $20.7 billion, and over 26.98 metric tons of heroin in a legal U.S. market.

D. MARIJUANA

1. Introduction

> World population reached 6.1 billion in mid-2000 and is currently growing at an annual rate of 1.2 per cent, or 77 million people per year. Six countries account for half of this annual growth: India for 21 per cent; China for 12 per cent; Pakistan for 5 per cent; Nigeria for 4 per cent; Bangladesh for 4 per cent, and Indonesia for 3 per cent. By 2050, world population is expected to be between 7.9 billion (low variant) and 10.9 billion (high variant), with the medium variant producing 9.3 billion. (*World Population Prospects*, 2001, p.1)

The above quote is important because marijuana is, without question, the most widely used and abused illicit drug in today's global drug market. The United Nations estimates that over 144 million people, or 2.4 percent of the global population, use cannabis. (*Global Illicit Drug Trends 2001*, 2001, p.225) When compared to other illicit drug markets, the breadth of the marijuana market is phenomenal: 155 countries reported

illicit cultivation of cannabis within their borders in 2000. Interpol used 1998 seizure data to identify 67 countries as "source countries" for cannabis cultivation. (*World Drug Report*, 2000, p.31 & 59)

The boundaries of this large market are distorted further by the various sources and methods used to cultivate marijuana. It is grown illicitly both outdoors and indoors, using sophisticated technology, and it grows wild in many parts of the world. In fact, the U.N. estimates that, in the late 1990s, indoor growers grew more than 25% of the cannabis in the U.S. and Western European markets domestically. (*World Drug Report*, 2000, p.31) This is fairly consistent with U.S. estimates, and U.N. and United States authorities both believe that this percentage will continue to rise as eradication programs become more effective.

Although we noted earlier that there are an estimated 67 source countries for cannabis, authorities have narrowed down the number of major cannabis-producing countries worldwide to only eight: Morocco (the largest producer), Afghanistan, Pakistan, Colombia, Mexico, Nigeria, South Africa, and Jamaica. (*World Drug Report*, 2000, p.31) Due to the reasons discussed earlier, it is impossible to calculate the exact amount of cannabis each of these countries cultivates. This uncertainty is illustrated by the fact that U.N. production and consumption estimates for cannabis varied by a factor of 30 in 1999—ranging between 10,000 and 300,000 metric tons. (*World Drug Report*, 2000, p.32) Linking the consumption and production models together, the United Nations arrived at an estimate of 30,000 metric tons for worldwide cannabis production. (*World Drug Report*, 2000, p.32)

On a much smaller scale, the *National Household Survey on Drug Abuse 2000* estimates that more than 8.2 million Americans used marijuana in 2000, equating to 3.75% of the U.S. population age 12 and older. This represents a decline from 11.4 million in 1999, which was 5.1% of the 12-and-over population. (*NHSDA*, 2000, p.1) It is not surprising, given the magnitude of its use and the conflicting attitudes toward it, that marijuana is the most controversial of the drugs analyzed in this thesis. In fact, the United States is rapidly becoming the minority in the fight to continue the criminalization of marijuana use among sovereign states throughout the world.

2. Quantity of Illicit Marijuana in the United States ($Q_{Illegal}$)

A significant portion of the marijuana consumed in the U.S. is cultivated and produced domestically. Currently, there are no truly reliable estimates for U.S. domestic production. This unknown leaves a gaping hole in any attempt to accurately analyze the U.S. marijuana market. We bring this up because it highlights a critical assumption in our analysis of the drug market, especially marijuana. All of the figures used here are best-guess estimates that must be considered with due diligence and careful scrutiny. We have stressed that point throughout our thesis, and the discussion of global marijuana production serves to reemphasize it. The best way to estimate the quantity of illicit marijuana in the United States is to arrive at an estimate for both international and domestic production (less seizure amounts), and then add the two together.

Four foreign countries dominate the U.S. marijuana market—Mexico, Canada, Colombia, and Jamaica. In 1975, Mathea Falco, then U.S. assistant secretary of state for international narcotics, estimated that 95% of the marijuana consumed in the United States came from Mexico. (Henderson, 1997, p.9) Mexico is still the major supplier of marijuana to the United States, but today the DEA estimates that Mexico provides for only 50% of the American market. Although the DEA estimates that Mexico produced over 6,600 metric tons of marijuana in 1999, we still cannot know how much of that amount was destined for the United States without knowing the total size of the U.S. market.

The ONDCP estimates that in 1999, the total worldwide net production of marijuana was only 11,200 metric tons grown by three major sources; Mexico (3,400 mt), Columbia (4,000 mt), and Other (3,500 mt). The "Other" category represents all other foreign sources of marijuana including Jamaica and Canada In order to estimate the international contribution to the U.S. marijuana market, we must first make a couple of assumptions. The first assumption we make is that the ONDCP estimate for total worldwide net production is correct. This seems reasonable and it is consistent with the source we have used for numbers with other drugs. Second, we will assume that only 10% of the Columbia and "Other" production is earmarked for America—a total of 750 metric tons. With these assumptions in mind, let's apply a high, low, and most likely percentage of production estimate from Mexico.

For our low estimate, let's be conservative and say that only 30% of Mexico's production is bound for the United States—1020 metric tons. On the high end, let's say that the number is closer to 90%—3060 metric tons. This number may not be as unrealistic as you might imagine. Mexico, aside from its proximity to the United States, is a poor country whose drug traders stand to gain tremendously from sales to Americans. For our most likely estimate, assume that 50% of Mexico's production is bound for the U.S.—1700 metric tons. The federal government claims that it seized nearly 1,235 metric tons of marijuana in 1999. (*Table 34. Federal-wide Cocaine, Heroin, Methamphetamine, and Cannabis Seizures, 1989–2001*, 2002) Accordingly, we must adjust our international contribution estimates down. After all the calculations, the estimates range from a high of 2,575 metric tons to a low of 535 metric tons, and a most likely estimate of 1,215 metric tons.

In an attempt to estimate the size of the domestic crop, we looked at some of the basic characteristics of marijuana cultivation. Most organizations concerned with marijuana cultivation, including the DEA, agree that a typical marijuana plant will yield between 177 and 412 grams of smokeable material. The National Organization for the Reform of Marijuana Laws (NORML) consolidated all of these estimates and arrived at an average yield per plant of ten ounces or *280 grams of useable marijuana*. (Gettman & Armentano, 1998, p.2) NORML's report also states that, in 1997, U.S. marijuana farmers harvested an estimated 8.7 million marijuana plants yielding approximately 2.436 billion grams of useable marijuana, or 2,436 metric tons (5.34 million lbs.). (Gettman & Armentano, 1998, p.2) Remember that these figures are for 1997. Although it is probably reasonable to assume a realistic growth rate for this market—say 1 to 2 percent annually—the totals for available marijuana, $Q_{illegal}$, are considerably larger than the ONDCP estimates, even with zero growth. The same would be true even if we assume a 25% market contraction each year from 1997 to 1999.

In 1999, the federal government claims it reduced the amount of domestic marijuana available by eradicating about 3,400,000 domestically grown plants (indoor and outdoor, excluding Ditchweed), or 952 metric tons. (Table 35. *Eradicated Domestic Cannabis by Plant Type, 1982–2001*, 2002) This effort reduced the 1999 domestic crop production (without growth increase estimations from 1997) to about 1,500 metric tons.

Combine this figure with the most likely international figure calculated earlier in this section, and we have a total illicit marijuana quantity of 2,715 metric tons. Unfortunately, as we have discovered in other areas of our research for this thesis, the U.S. government has offered conflicting information that makes our estimate still seem unreasonable.

The ONDCP estimates that only 1,028 metric tons of marijuana was consumed in the U.S. market in 1999. (Table 39. *Domestic Drug Consumption, Calendar Years 1996–2000,* 2002). That represents a bit more than a third of the total product available according to our summation of the various estimates of international and domestic production. It is less by nearly half if we use with the lowest Mexican estimate. How can so much be available, and so little consumed? What is the reason for the large delta? Again, these numbers are difficult to pinpoint. In the interest of remaining conservative, however, we will use the ONDCP's 1999 domestic drug consumption estimate as the illicit quantity of marijuana for our deadweight calculations.

3. Price per Ounce of Illicit Marijuana ($P_{Illegal}$)

The price of illicit marijuana varies greatly, depending on the quality, quantity purchased, source of origin, and various other point-of-sale factors. Table 4.8 highlights the differences that these factors make in regional marijuana prices.

Region	Commercial	Sinsemilla
Northeast/Mid-Atlantic	$500-$4,000	$1,500-$2,500
Great Lakes	$850-$3,000	$2,500-$7,000
Pacific/West Central	$100-$3,500	$1,000-$6,000
Southwest	$250-$6,000	$900-$4,000
Southeast/Florida	$500-$1,600	$3,000

Table 4.8. Marijuana Prices per Pound. From *National Drug Threat Assessment 2001 – The Domestic Perspective*.

Despite these wide ranges, most price estimates for marijuana in the United States are surprisingly similar. The United Nations estimated that the average price of cannabis herb (marijuana) in the United States was $10.20 per gram ($285.60 per ounce) and $5,500 per kilogram in 1999. (*Global Illicit Drug Trends 2000*, 2000, p.169) This is very

close to the White House's ONDCP estimate of $293 per ounce in 1999. (Hozik et al, 2000, p.22)

4. Estimated Legal Price per Ounce/Gram of Marijuana (P_{Legal})

Estimating the legal price for marijuana is much easier than it was for either cocaine or heroin. Arriving at a realistic legal price does not require any sophisticated reverse engineering or arguable assumptions. In fact, a few existing quasi-legal marijuana markets provide real-time legal prices. Although Belgium and Portugal have recently decriminalized marijuana, and it seems that Germany will soon follow suit, the most popular legal marijuana market is, of course, in The Netherlands. World famous Amsterdam is home to over 300 "coffee shops," and there are approximately 1,000-1,500 coffee shops operating throughout the entire country. In any of these shops, people can order a small amount of marijuana or hashish from the menu—enough for personal consumption on the premises—or simply bring their own to smoke. This has been the case for over 26 years. The official law tolerates the possession and sale of up to five grams of hashish or marijuana in coffee shops, although the distribution and manufacture are technically illegal. (Gieringer, 1997) Most coffee shop prices range between $5-20. In fact, in a search of the Internet, we found numerous websites selling a variety of marijuana seeds at prices averaging between $45-$195 for 15 marijuana plant seeds (the female seeds were considerably more expensive). In all cases, these sites said shipment to the United States was not a problem.

Closer to home, researcher Dale Gieringer estimates that, in an untaxed, unregulated market, marijuana might reasonably be as cheap as other leaf crops—around $0.75-$2.00 an ounce or $.02-$.07 a gram, depending on quality. (Gieringer, 1997) In his 1994 article entitled "*The Economics of Cannabis Legalization*," Gieringer effectively explained and defended this estimate:

> Cultivation expert Ed Rosenthal estimates that domestic labor costs could be as high as $5 per ounce. Advertisements from medical catalogs indicate that cannabis cost about $2.50-$5 per pound in 1929-30. Adjusting for inflation, this works out to $1.20-$2.40 per ounce, a breathtaking 100- to 300-fold reduction from today's illicit prices, which range from $100-$200 per ounce for low-grade Mexican to $400- $600 per ounce for high-grade sinsemilla.
>
> It is useful to translate these prices to a per-joint basis, where one joint is defined to represent the standard dosage of marijuana. The number

of joints in an ounce depends on the potency of the product involved, where potency is measured in terms of the concentration of tetrahydrocannabinol (THC), the chief psychoactive ingredient in marijuana. THC potencies typically range from 2-3% for low-grade leaf to 10% or more for premium sinsemilla buds. We will define a standard dose of THC to be that contained in the government's own marijuana joints, which NIDA supplies to researchers and selected human subjects. These consist of low-quality 2.5%-3% potency leaf rolled into cigarette-sized joints of 0.9 grams, yielding a 25-milligram dose of THC. The same dose can be had in a slender one-third or one-quarter gram joint of 10-12% sinsemilla. A typical joint has been estimated to weigh about 0.4 grams. Taking this as a standard, we will define a "standard joint" to be 0.4 grams of average-quality 6% buds. Thus an ounce of "standard pot" equals 60 joints, an ounce of 12% sinsemilla 120, and an ounce of government pot only 30 joints. Due to the fact that the price of marijuana tends to be proportional to potency, the price of a one-quarter gram joint of $600-per-ounce sinsemilla is about the same as a one-gram joint of $150-per-ounce ditch weed, that is around $6.

The free-market price of joints can also be calculated by comparison to tobacco cigarettes, which would probably cost about the same to manufacture. Cigarettes now sell at an average of $1.83 per pack, or $.09 per cigarette, one-quarter of which represents federal and state taxes. There is no reason to think that joints could not be sold for the same price under legalization.

At a nickel per joint, marijuana would be a uniquely economical intoxicant. For only one-half dollar per day, a pothead could nurse a whopping ten-joint per day habit. It may be doubted whether public opinion would tolerate so low a price for marijuana. On one hand, it would invite extensive abuse. Parents would no doubt object against making a serious marijuana habit so affordable for their young. Cheap pot would also pose a serious challenge to the alcohol industry, a powerful political interest, whose products are over ten times as expensive. In order to make legalization politically palatable, it would almost certainly be necessary to raise the price through taxation or regulation**.**

One [other] way to estimate a reasonable price for marijuana is to evaluate it in comparison to the major competing intoxicant, alcohol. While it is impossible to make an exact comparison between pot and booze, since their duration and effects are different and dosages vary from person to person, a joint might be roughly equated to an intoxicating dose of alcohol - between one and two ounces, or two to four drinks. Thus one joint might be worth two to four 12-oz. beers or 1/3 - 2/3 bottle of wine. These are currently sold on grocery shelves at a minimum price of around $1.50 - $2.50. It may therefore be concluded that a reasonable minimum price for marijuana should be around $1.50 - $2.50 a joint, with higher prices for

premium grades. This works out to $90 - $150 per ounce for standard 6%-potency marijuana. (Gieringer, 1997)

Gieringer did an outstanding job of analyzing the finer points in this area of the marijuana debate. However, in our opinion, it is irrelevant that beer and wine cost what they do. The point is that if marijuana were legalized, competition among suppliers would compete the price down—competition, after all, is a hardy weed. Competition may also force firms into more aggressive and expensive marketing, R&D, etc. to maintain market share. For these reasons, our estimate includes expected costs above raw materials and a 34% contribution margin. P_{legal} , for the purpose of our analysis is $.52 per joint, or $31.20 per ounce, for standard 6%-potency marijuana in 1999.

5. Estimating the Legal Quantity of Marijuana Using Elasticity of Demand

The most widely accepted estimates for the price elasticity of demand for marijuana are as follows:

-0.5 to - 1.5 (Nisbet and Vakil, 1972, p.474)

-0.06 (Chaloupka and Saffer, 1995)

Marijuana

Elasticity of Demand (η)	Prohibition Quantity ($Q_{illegal}$- oz.)	Legal Price(oz.)	Prohibition Price(oz.)	Price Factor	Legal Quantity (Q_{legal} oz.)	Legal (Q_{legal}) Metric Tons
-1.5	3,426,667	$31.20	$293	($0.89)	8,019,336	2,406
-1.25	3,426,667	$31.20	$293	($0.89)	7,253,891	2,176
-1	3,426,667	$31.20	$293	($0.89)	6,488,446	1,947
-0.75	3,426,667	$31.20	$293	($0.89)	5,723,001	1,717
-0.093	3,426,667	$31.20	$293	($0.89)	3,711,412	1,113
-0.06	3,426,667	$31.20	$293	($0.89)	3,610,373	1,083

Note: 1,028mt = 1,028,000,000 grams = 34,266,667 ounces; $31.20 per ounce equates to $.52 per joint.

Table 4.9. Calculating the Legal Quantity of Marijuana

Table 4.9 demonstrates that using a range of demand elasticities for marijuana, from –0.06 to -1.50, results in a range of consumption quantities in a legal market and

helps to further develop our analysis of the illicit marijuana market. As illustrated above, these elasticities result in a range of consumption quantities that is drastically different from current consumption estimates [1,028 mt or 34,266,667 ounces]. In fact, the legal market consumption estimates, [range of 1,083 – 2,406 metric tons] represent a 5 to 234 percent increase in consumption from current prohibition-induced marijuana quantities. Given these results, it is imperative to remember that the DWL associated with this market is well into the billions of dollars.

6. Conclusion: Deadweight Loss from Marijuana

As the previous table shows, at the average elasticity of -.093, the legal quantity of marijuana demanded would be 1,114 metric tons or about 8.4% more than estimated quantity levels in 1999. This, in turn, would result in a DWL of more than $9.4 billion. Using our 5% of area B "rent" estimate means that marijuana traffickers made a whopping $449 million in 1999. Additionally, this means that it costs marijuana traffickers approximately $8.54 billion ["payment for risk"] to operate in America's illegal marijuana market. Table 4.10 illustrates the exact results from our model.

Marijuana

Elasticity of Demand (η)	Deadweight Loss Payment for Risk	Deadweight Loss Underconsumption	Total DWL $
-1.5	$8,984,721,203	$6,366,163,404	$15,350,884,607
-1.25	$8,984,721,203	$5,305,136,170	$14,289,857,258
-1	$8,984,721,203	$4,244,108,936	$13,228,829,909
-0.75	$8,984,721,203	$3,183,081,702	$12,167,802,561
-0.5	$8,984,721,203	$2,122,054,468	$11,106,775,212
-0.06	$8,984,721,203	$254,646,536	$9,239,367,078

Table 4.10. Calculating the Deadweight Loss from Marijuana

D. METHAMPHETAMINES

1. Introduction

In contrast to the plant-based drugs discussed above, there was no international control of the precursor chemicals required to manufacture methamphetamines and amphetamines prior to 1988. The 1988 Vienna Convention against the Illicit Traffic of Narcotic Drugs and Psychotropic Substances provided for international cooperation in extraditing drug offenders and confiscating assets and specifically addressed the rapidly expanding market for clandestinely manufactured synthetic drugs. (*Global Illicit Drug Trends 2001*, 2001, p.18) In analyzing the methamphetamine market, we faced all of the challenges presented by the other illicit drug markets—the obstacles in chemically engineering the legal price and the difficulties involved in estimating clandestine domestic production posed the most daunting obstacles. Widespread clandestine production of these drugs makes any effort to accurately determine market characteristics futile at best. Despite this and in order to remain consistent, we decided to use the ONDCP estimates of Q_{legal} for the methamphetamine market. All of the ONDCP estimates are contained in Table 4.11.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number of Hardcore Users (thousands)	386	339	290	314	389	479	414	376	310	356	356	356
Median weekly expenditure	$118	$112	$108	$105	$102	$99	$96	$93	$91	$90	$87	$87
Price per pure gram	$207	$227	$194	$229	$215	$192	$184	$171	$167	$140	$140	$140
Total expenditures (billions)	$	$	$	$	$	$	$	$	$	$	$	$
	3.2	2.6	2.2	2.3	2.7	3.3	2.8	2.4	2.0	2.2	2.2	2.2
Metric tons	15.3	11.6	11.2	9.9	12.7	17.1	15.0	14.3	11.8	15.9	15.4	15.4

Sources: NHSDA 1988, 1990 through 1997; STRIDE 1981 through 1998; DUF 1989-1998; Uniform Crime Reports 1988-1997.

Table 4.11. From Hozik et al, 2000, p. 21

2. Quantity, Illicit Price, and Estimated Legal Price of Illicit Methamphetamine in the United States

Recognizing that these estimates are based on extremely shaky assumptions, we also feel it important to stress that even the DEA admits that there is "expanding demand" in this market. (DEA, Drug Intelligence Brief, September 1999, p. 8) In fact, methamphetamines are growing in popularity because they are cheaper and have a longer-lasting euphoric effect than crack cocaine. (National Drug Intelligence Center, South Carolina Drug Threat Assessment, December 2001) Furthermore, many believe that the surge in demand can be directly linked to the rising popularity of the drug ecstasy. Ecstasy represents a new challenge to law enforcement officials. The United States Customs Service reinforced this assertion in its October 1999 issue of *U.S. Customs Today*:

> "Ecstasy," a designer drug popular among U.S. teens and club-goers, was seized by the U.S. Customs Service in record amounts in Fiscal Year 1999, prompting fears that abuse and trafficking of the drug are skyrocketing in the United States.
>
> In the first ten months of FY99, Customs seized approximately two million doses of Ecstasy—a record that is nearly seven times greater than last year's total. Seizures of 100,000 tablets—once rare at U.S. airports—have become common in recent months.
>
> Ecstasy is a synthetic drug that is chemically known as MDMA, or Methylenedioxymethylamphetamine. It is produced illegally in clandestine laboratories. While some Ecstasy labs have been found in the United States, most Ecstasy production is believed to take place in Europe, particularly in the Netherlands. "What Colombia is to cocaine, the Netherlands is to MDMA," a synthetic drug specialist with the Dutch Intelligence Service noted on Dutch television in 1995. (Boyd, 1999)

Accepting Q_{legal} as 15.4 metric tons and P_{legal} as $140 per pure gram, we attempted to engineer the legal price for methamphetamines despite the difficulties discussed earlier. Figure 4.2 graphically illustrates the process used to manufacture these drugs. Methamphetamine is commonly prepared illicitly by the reduction of ephedrine or

pseudoephedrine using red phosphorus and hydroiodic acid. Traditionally, it is then converted to methamphetamine hydrochloride by adding hydrochloric acid. ("*Chemicals Required for the Illicit Manufacture of Drugs*," 2000, p.16) However, due to tight regulation of large quantities of the required precursor chemicals, alternative production methods are becoming more common. For example, the ephedrine-pseudoephedrine reduction or "Red P" method is also used to produce methamphetamine. This method uses ephedrine or pseudoephedrine as a precursor chemical and the essential chemicals iodine and red phosphorus. Diet pills are one readily available source of ephedrine, and many over-the-counter cold medicines contain pseudoephedrine. Methamphetamine producers extract the ephedrine or pseudoephedrine from these pills during cooks, using coffee filters, coffeepots, tabletop grills, and microwave ovens. This method typically produces ounce quantities, often only enough for personal use. The process does not require heat, although heat may be applied to acquire a higher-quality yield. Similar to the "Red P" method, the "Nazi" production method is also widely used. The "Nazi" method does not require extensive knowledge of chemistry, uses no heat, and laboratories

Nazi Method	
• Quicker than the ephedrine reduction method • Easily mobile laboratories • Yields less per cook—but less risk to cooker • Operated primarily in the South and Midwest • Most ingredients available over the counter	
Ingredient	**Source**
Acetone	Paint thinner
Pseudoephedrine	Decongestant
Lithium	Batteries
Sodium hydroxide	Drain cleaner
Ether	Starter fluid
Anhydrous ammonia	Fertilizer

(South *Carolina Drug Threat Assessment*, December 2001)

Table 4.12. From South Carolina Drug Threat Assessment, 2001

can be set up in something as small as a cardboard box. Table 4.12 illustrates the primary characteristics of this method of production. (South Carolina Drug Threat Assessment, 2001, p.23) Incidentally, we could find no explanation of the origins or the reason behind the name "Nazi" in the Nazi Method.

Table 4.12 highlights the potential sources of methamphetamine precursor chemicals.

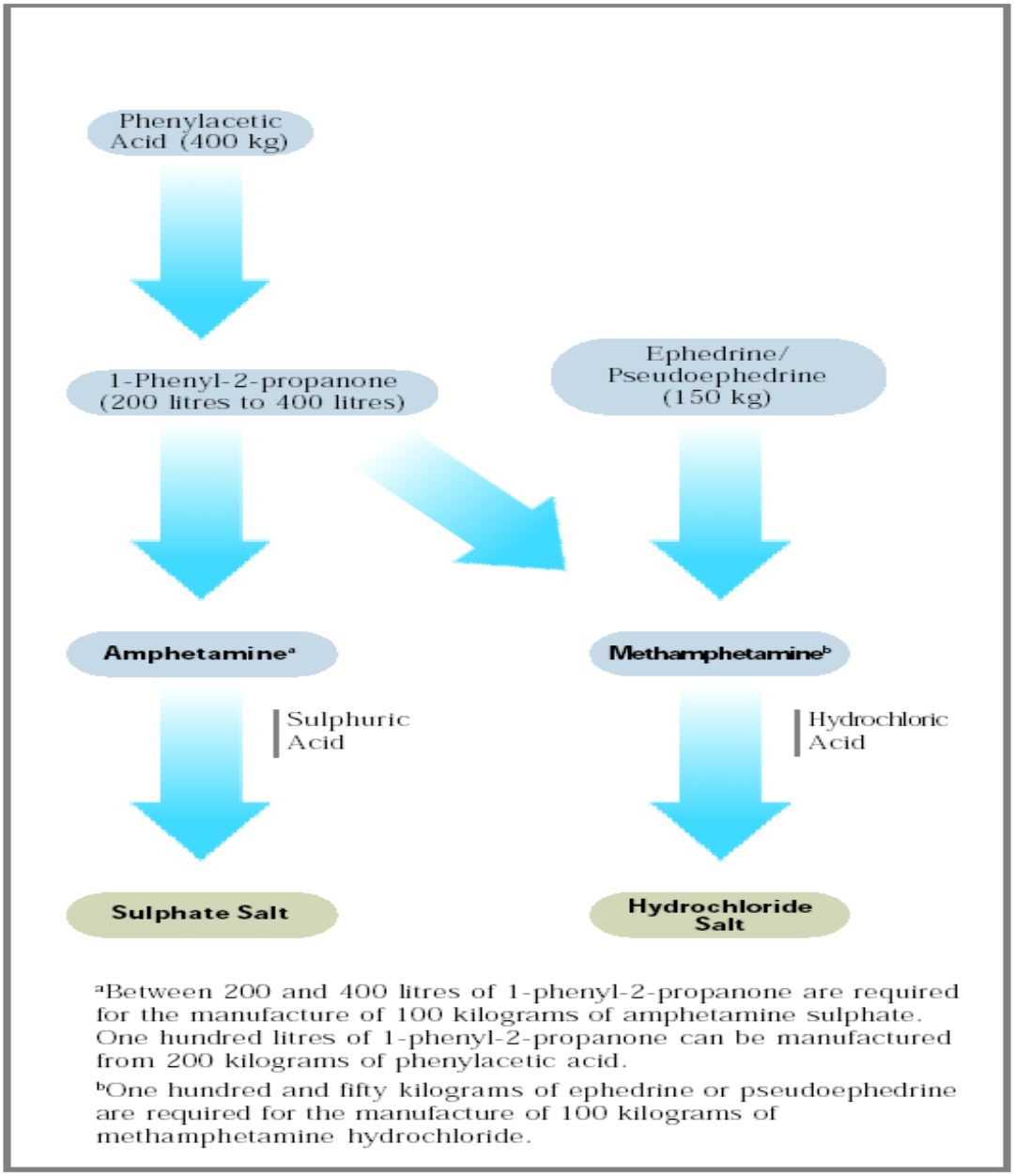

Figure 4.2. From *Chemicals Required for the Illicit Manufacture of Drugs*, 2000, [p.17]

Using the same method to estimate the legal prices of cocaine and heroin yields a Pl_{egal} for methamphetamines that is very similar to that of ephedrine. Ephedrine tablets currently sell for around $40.00 per 375-tablet bottle of 25mg tablets. (D&E Pharmaceuticals Inc., 2002) Adjusting this into 1999 dollars results in a price of $37.50 for the same 375-tablet bottle. This equates to approximately $.04 per mg, $.40 per gram, or $.10 per tablet of ephedrine of this type. Using this as a realistic foundation, we use $.40 per pure gram as our estimated P_{legal} versus the illicit price of $140 per gram accepted above for methamphetamine. This equates to a 35,000% mark-up at the retail level.

In an effort to further clarify the dynamics of this market, we explored the specifics of actually manufacturing methamphetamines and discovered that it takes approximately 48,000 25mg ephedrine tablets to extract one kilo of pure ephedrine. Theoretically, one kilogram of ephedrine or pseudoephedrine will yield 0.92 kilos of methamphetamine, although actual yields in clandestine labs are typically in the range of 50% to 75%. (DEA, 1996) This would mean that, if we strictly used these figures and yields, it would take $5,120 worth of ephedrine tablets purchased legally on the retail market—that's 128 375-tablet bottles @ $40.00 per bottle—to conservatively make .50 kilos of methamphetamines. All of this is important because it puts the potential profit available in this market into perspective. The DEA estimates that the average price of methamphetamines was approximately $4,000 – $30,000 per pound or approximately $37,400 per kilogram in 1999, depending on numerous point-of-sale factors. (DEA, 1999, p.8)

So as we can see, a trafficker with absolutely no external assistance in this market can spend roughly $5,200—for ephedrine tablets, hydrochloric acid, and the required cutting agents—and manufacture half a kilogram of methamphetamine worth over $18,000 on the retail market in a single afternoon. 346% profit may be just enough incentive to overcome the risk of getting caught.

Reinforcing these estimates, intelligence gathered from the DEA indicates that wholesale prices of MDMA range from $.50 to $2.00 per dosage unit. The drug is sold in bulk quantity at the mid-wholesale level in the United States for approximately $8 per dosage unit. The retail price of MDMA, as sold in clubs in the United States, remains

steady at approximately $20-$30 per dosage unit. (*Drug Intelligence Brief: MDMA—ECSTASY*, 1999, p.4)

3. Elasticity of Demand and Q_{legal} for Methamphetamine

Currently, no specific data exist on the price elasticity of demand for methamphetamine. For this reason, we used the same elasticity values that exist in the cocaine market to estimate Q_{legal} and the relevant DWL. We did so because these two markets seem to most closely mirror each other. Table 4.13 presents the resulting legal quantity of methamphetamine demanded a various elasticities of demand.

Methamphetamine

Elasticity of Demand (η)	Prohibition Quantity ($Q_{illegal\text{-}GRAMS}$)	Legal Price	Prohibition Price	Price Factor	Legal Quantity Grams	Legal (Q_{legal}) Metric Tons
-1.7	15,400,000	$0.40	$140	($1.00)	41,505,200	41.51
-1.5	15,400,000	$0.40	$140	($1.00)	38,434,000	38.43
-1.25	15,400,000	$0.40	$140	($1.00)	34,595,000	34.60
-1	15,400,000	$0.40	$140	($1.00)	30,756,000	30.76
-0.7	15,400,000	$0.40	$140	($1.00)	26,149,200	26.15
-0.51	15,400,000	$0.40	$140	($1.00)	23,231,560	23.23
-0.5	15,400,000	$0.40	$140	($1.00)	23,078,000	23.08
-0.36	15,400,000	$0.40	$140	($1.00)	20,928,160	20.93
-0.28	15,400,000	$0.40	$140	($1.00)	19,699,680	19.70
-0.23	15,400,000	$0.40	$140	($1.00)	18,931,880	18.93

Table 4.13. Calculating the Legal Quantity of Methamphetamine

Using cocaine's price elasticities expanded the consumption quantity range of the methamphetamine market to between a low of 18.93 and a high of 41.51 metric tons, a 23 to 270 percent increase in consumption quantities. Calculating an average elasticity of -.803 resulted in a median consumption quantity of 27.73 metric tons versus the ONDCP'S 1999 estimate of 15.4 metric tons. This is an 80% increase, which dramatically affects DWL.

4. Conclusion: Deadweight Loss from Methamphetamine

Methamphetamine represented a DWL of over $3 billion. Traffickers in this market made an estimated $107 million dollar "rent" for accepting the risks present here. Table 4.14 calculates the range of deadweight loss attributable to illicit Methamphetamine markets.

Methamphetamine

Elasticity of Demand (η)	Deadweight Loss Payment for Risk	Deadweight Loss Underconsumption	Total DWL $
-1.7	$2,142,140,021	$1,822,142,960	$3,964,282,981
-1.5	$2,142,140,019	$1,607,773,200	$3,749,913,219
-1.25	$2,142,140,017	$1,339,811,000	$3,481,951,017
-1	$2,142,140,015	$1,071,848,800	$3,213,988,815
-0.7	$2,142,140,013	$750,294,160	$2,892,434,173
-0.51	$2,142,140,012	$546,642,888	$2,688,782,900
-0.5	$2,142,140,012	$535,924,400	$2,678,064,412
-0.36	$2,142,140,010	$385,865,568	$2,528,005,578
-0.28	$2,142,140,010	$300,117,664	$2,442,257,674
-0.23	$2,142,140,009	$246,525,224	$2,388,665,233

Table 4.14. Calculating the Deadweight Loss From Methamphetamine

F. CONCLUSION

In this chapter, we estimated the deadweight loss associated with the prohibition of four of America's most costly vices—cocaine, heroin, marijuana, and methamphetamine. Although our analysis revealed many questions and concerns, not to mention a number of inconsistencies, we were able to make estimates for the losses imposed on society as a result of the drug war. They are alarming. The economic or deadweight loss associated with the "payment for risk" and "underconsumption" components of the illicit drug market was **approximately $90.29 billion dollars in 1999**. As predicted and stressed in chapter III, the largest portion of this loss came from the "payment for risk" ($65.36 billion), while the underconsumption of these drugs

represented roughly $24.93 billion, roughly 28% of the total DWL. For free market advocates, this represents the epitome of social inefficiency and public policy failure.

Legalizing drugs would immediately eliminate all of the $65.36 billion worth of social inefficiency associated with the excessive risks of conducting business in an illegal market. That result is essentially un-debatable. In contrast, we admit that, if drugs were legal, more people might experiment with them. However, even this is uncertain. In fact, a 1997 survey on drug abuse stated that 16% of Dutch citizens reported having ever used marijuana, compared to 32 percent of Americans. (SAMHSA, 1998, p.18) This is significant because marijuana is widely available in coffee shops throughout the Netherlands and has been legal there for almost 30 years. Table 4.15 compares the results of Dutch policy with the prohibitive policies followed in the United States.

Comparing Important Drug and Violence Indicators

Social Indicator	Years	USA	Netherlands
Lifetime prevalence of marijuana use (ages 12+)	1998 vs. 1997	33%	15.6%
Past month prevalence of marijuana use (ages 12+)	1998 vs. 1997	5%	2.5%
Lifetime prevalence of heroin use (ages 12+)	1998 vs. 1997	1.1%	0.3%
Incarceration Rate per 100,000 population	1997 vs. 1996	645	77.3
Per capita spending on drug-related law enforcement	1997 vs. 1995	$81	$27
Homicide rate per 100,000 population	1995 vs. 1995	8	1.8

Table 4.15. From *The Facts: The Netherlands*

Adding to this argument are a number of U.S. researchers who have examined America's experience with alcohol prohibition. For example, Auburn University Economics Professor Mark Thorton states:

> Consumption of alcohol actually rose steadily after an initial drop. Annual per capita consumption had been declining since 1910, reached an all-time low during the depression of 1921, and then began to increase in 1922.

> Consumption would probably have surpassed pre-Prohibition levels even if Prohibition had not been repealed in 1933. Illicit production and distribution continued to expand throughout Prohibition despite ever-increasing resources devoted to enforcement. That pattern of consumption . . . is to be expected after an entire industry is banned: new entrepreneurs in the underground economy improve techniques and expand output, while consumers begin to realize the folly of the ban. . . . According to Warburton, from 1921 to 1929 the apparent per capita consumption of beer increased 463 percent, that of wine increased 100 percent, and that of spirits increased 520 percent. While per capita beer consumption in 1929 was only one-third the 1909 level, per capita consumption of wine and spirits was above 1909 levels. If that trend had continued, total per capita consumption of alcohol would have surpassed pre-Prohibition levels during the mid-1930s. (Thorton, 1991)

The bottom line is: where there is demand for a product there will be supply. Given that people have been using these substances, in one form or another, for thousands of years, America's efforts to prohibit the use of these drugs may only be making matters worse. In a legal and untaxed market there is no underconsumption loss. But, more remarkable, over two times the DWL caused by underconsumption is spent annually just to fund the risk of doing business in these markets and not, alternatively, used for legal, productive activities. In our opinion, these are strong economic arguments against prohibition. These results, however controversial, sound like incentive enough to start a serious dialogue concerning the revision of U.S. drug laws.

In the next chapter, we examine a few of the most glaring opportunity costs resulting from America's drug war.

V. INDIRECT COMPONENTS OF THE DEADWEIGHT LOSS

A. INTRODUCTION

There are costs that indirectly result from the existence of prohibition—costs that society would not incur in the absence of prohibition. These additional costs must be added to our calculations in Chapter IV to determine the overall deadweight loss of the drug war. Some of these are more obvious than others; some examples are federal spending for reducing the supply of drugs, the costs associated with personal property crimes committed by drug users, and the costs to victims of drug-related murders. However, we must consider many other, less obvious, costs associated with the drug war. For example, both the lost potential legal earnings of incarcerated drug offenders and the productivity loss of victims of crime are real costs of prohibition that amount to billions of dollars each year. The indirect costs of prohibition can generally be broken down into five major categories: Reduction of Supply, Criminal Justice System, Health Care Costs, Productivity Losses, and Other Costs, which, incidentally, include some intangible costs, such as the loss of freedom to choose for those who wish to consume drugs. In our analysis, we were careful to exclude from our calculations those costs to individuals and society that would remain under legalization. For example, we expect that the costs of both government- and privately funded drug rehabilitation programs will most likely increase as a result of legalization and, thus, will not consider them a cost of prohibition.

The results of our analysis in this chapter reflect our very best efforts to discover the actual costs incurred by the individuals and agencies that committed resources to fight the drug war in 1999. In some cases, we discovered conflicting estimates, and in others, we discovered similar estimates reached through different methods. When we found inconsistent estimates for the same function, however, we simply chose the more conservative figure for our calculations. For example, if the Bureau of Justice Statistics estimated the total expenditure for drug offenders in federal prisons at $75 million, while the ONDCP estimated it at only $68 million, then we would use the ONDCP figure in our calculations. By selecting this way, we ran the risk of underestimating the total deadweight loss of prohibition. However, because this study is potentially controversial and because we believe the final sum as calculated is still extremely significant, we felt it

prudent to error on the side of caution—the true deadweight loss from the drug war (if we are incorrect) can only be greater than our estimate.

Lastly, our analysis in this chapter is, admittedly, general in nature. We report the cost of health care, for example, in general sub-categories, without the effort of further delineation or explanation. The reason for this is twofold. First, these costs are, in fact, estimates at best because, in some cases, it is difficult to discern the exact amounts committed for any given function and whether those amounts, in all cases, can be directly attributed to the drug war. Second, though they are important to the bottom line, the indirect costs of prohibition are not the focus of our thesis. We stand by our reported estimations, nonetheless, as reasonably accurate and comprehensive.

B. REDUCTION OF SUPPLY

In 1998, President Clinton asked Congress to increase spending to stop illicit drugs by $735 million to a total of $17,800 million during fiscal year 1999. The costs of enforcing drug prohibition laws are significant and second in magnitude only to lost productivity. Drug traffic control costs are the primary target of anti-prohibitionists because they are easily weighed against the goals and objectives of the enforcing agencies. More often than not, it has been our observation, the efforts of law enforcement do not meet these goals and, thus, do not justify the expenditures. As an example of such criticisms, James Ostrowski, an associate policy analyst at the Cato Institute, pointed out that

> [a] General Accounting Office (GAO) report recently released at the White House Conference for a Drug Free America contains overwhelming evidence of the failure of the Reagan administration's war on drugs.[94] Contrary to the claims of some critics, the war on drugs did not fail for lack of effort. The federal drug control budget increased from $1.2 billion in 1981 to nearly $4 billion in 1987. The FBI and the military were brought into drug enforcement. Two major pieces of legislation were passed to toughen penalties and give enforcers more powers: the Comprehensive Crime Control Act of 1984 and the Anti-Drug Abuse Act of 1986. Arrests rose 58 percent and federal prisons became filled with convicted drug dealers. Drug seizures greatly increased—362 percent in the case of cocaine.
>
> The GAO reported the results:

- Drug abuse in the United States has persisted at a very high level throughout the 1980s.

- Cocaine. The amount of cocaine consumed more than doubled. The price declined about 30 percent [unadjusted for inflation]. The average purity doubled. Cocaine-related deaths rose substantially.

- Heroin. The price of heroin declined 20 percent [unadjusted for inflation]. The average purity rose 33 percent. Heroin-related deaths rose substantially.

- Marijuana. While use declined, marijuana continues to be readily available in most areas of the country, with a trend toward increased potency levels. Marijuana is now grown in all 50 states and, to avoid detection, marijuana growers are moving their operations indoors and are growing smaller and more scattered plots outdoors.

  In short, prohibition has failed to eliminate or even seriously reduce the use of illegal drugs. . . . (Ostrowski, 1989, p.21)

In the following section, we list the actual or estimated expenditures committed in 1999 to reduce the supply of illicit drugs available to the American public.

1. Federal Expenditures

The costs incurred by individuals and agencies to reduce the supply of drugs coming from other countries and from within U.S. borders are a direct and indisputable result of the war on drugs. Federal, state and local governments all make expenditures to reduce the supply of drugs in their jurisdictions. These costs include, but are not limited to, interdiction, crop eradication, and seizures. In September 2001, the Office of National Drug Control Policy released a report titled *The Economic Costs of Drug Abuse in the United States 1992-1998*, which details the federal and, to some extent, state expenditures attributable to reducing the supply of drugs. To their discredit, unfortunately, they did not disclose the criteria they used to earmark these amounts. Table 5.1 lists the federal expenditures in 1999.

FEDERAL AGENCY	ACTUAL BUDGET FY 1999 $ Millions	
Justice		
Drug Enforcement Agency	1304	
Federal Bureau of Investigation	589.4	
Immigration and Naturalization	428.7	
Interpol	0.2	$ 2,322.30
Treasury		
Bureau of Alcohol, Tobacco, and Firearms	231.7	
Internal Revenue Service	72.4	
U.S. Customs Service	956.1	$ 1,260.20
Transportation		
Federal Aviation Administration	23.6	
U.S. Coast Guard	815.3	$ 838.90
State		
Bureau of International Narcotics and Law Enforcement Affairs	489.2	
U.S. Information Agency	8.5	$ 497.70
Agriculture		
Agriculture Research Service	5.3	
U.S. Forest Service	5.8	$ 11.10
Interior		
Bureau of Indian Affairs	17.5	
Bureau of Land Management	5	
Fish and Wildlife Service	1	
National Park Service	9.5	$ 33.00
Defense	904.3	$ 904.30
Total Federal Funds for Reducing the Supply of Drugs		**$ 5,867.50**

Table 5.1. 1999 Federal Cost of Reducing the Supply of Drugs, After *The Economic Costs of Drug Abuse in the United States 1992-1998*, [p. 83]

As the bottom line indicates, in that one year, the federal government alone spent more than $5.8 billion dollars to reduce the supply of drugs available to American consumers. This represents about 34% of the total $17.124 billion Federal drug control budget in 1999.

2. State and Local Expenditures

It is difficult to determine the level of state or local spending on the reduction of supply. In most cases, estimates are available only for total state spending on law enforcement and incarceration. A 1999 LEMAS survey presents data collected from a representative sample of the more than 13,000 general-purpose local police departments nationwide. The survey describes the number and size of agencies, job classification of personnel, agency functions, community policing activities, computer and information systems, and written policies and procedures. It does not, however, delineate the percent of local resources allocated, on average, to enforce drug laws or to specifically reduce the supply of drugs. (Local Police Departments, 1999) A report released by the National Center on Addiction and Substance Abuse at Columbia University concluded that states spent $30.7 billion in 1998 on substance abuse under the category heading "Justice," which included adult corrections, juvenile justice, and judiciary. (*Shoveling Up: The Impact of Substance Abuse on State Budgets*, 2001) Of this amount, the study attributed $574 million for state-funded drug enforcement programs.

Another study found that "[b]y 1997, the federal budgets for drug control reached US$16 billion, two thirds of it for law enforcement agencies. State and local funding increased to approximately the same level." (*International Responses, United States*, 2001) By these calculations, state and local agencies presumably spent $10.67 billion in FY97 dollars for law enforcement activities alone. All of these figures, however, are low compared to the Office of National Drug Control Policy's estimate in 1995 that state and local agencies spent nearly $20 billion to control illicit drugs. Yet, this estimate seems to include some criminal justice systems costs as well and, therefore, cannot be used in its entirety.

There is also danger of double counting in all of these estimates because the point at which federal funds end and state and local funds begin is often obscure. In 1999, the

federal government, through CTAC Technology Transfer Program Appropriations, provided $13 million to state and local drug enforcement efforts. (*Counterdrug Research and Development Blueprint Update*, 2002, p.15) The Technology Transfer Program was designed to bring advanced drug crime fighting technology and necessary training to 2,500 state and local law enforcement agencies throughout the United States. It is unclear whether these amounts were included in the budgets shown in Table 5.1. Therefore, to estimate the total funds committed by state and local agencies to reducing the supply of drugs, we will choose the lowest and most specific estimate that we found: $574 million. Thus, our total estimate for the supply-reduction activities by federal, state and local governments is $6,441.5 million or roughly $6.4 billion.

C. CRIMINAL JUSTICE SYSTEM

In the realm of criminal justice, we considered three functions that incur additional costs as a direct result of prohibition: enforcement, legal and adjudication, and federal, state and local incarceration. The Bureau of Justice uses these same categories. Using this model enabled us to ensure completeness and consistency in our calculations for 1999. In 1992, the ONDCP concluded that illicit drugs added $13.738 billion to the total cost of the criminal justice system. Table 5.2 presents the specific breakdown.

CRIMINAL JUSTICE SYSTEM	FY92$M	% OF TOTAL
Enforcement	$4,644	34%
Legal and adjudication	$1,210	9%
Federal, State, and Local correction	$7,884	17%
TOTAL	$13,738	100%

Table 5.2. Criminal Justice System Costs in 1992

In 1992, the total national expenditure for criminal justice was $93,777 million in FY 1999 dollars. Thus, the costs directly associated with illicit drugs represent about 14.6% of the national total. Using the U.S. Department of Justice statistics for 1999, we can apply this percent to the 1999 total in order to achieve a rough estimate of the criminal

justice system costs. Table 5.3 contains the values for 1999. Table 5.3 shows that total criminal justice expenditures in 1999 were $146,556 million dollars, a marked increase from 1992. Applying 14.6% to the 1999 total, we come up with a total for illicit drug related criminal justice expenditures of $21,469.94 million dollars, or roughly $21.5 billion dollars.

Table 5.3 offers some other interesting information. For example, of the total expenditures in 1999, Local (Direct) costs represented 51%, while State and Federal (Direct) represented only 34% and 15% respectively. This leaves little doubt that the cities and counties of our nation are bearing the brunt of these prohibition costs.

Though it may be adequate to use $21.5 billion dollars as our estimate for 1999 criminal justice expenditures, we thought it necessary to look at each individual function because some of our data indicated that the percentage of total criminal justice expenditures due to illicit drugs may have increased beyond its 1992 level of 14.6%.

1. Enforcement

In our analysis, we found two estimates for enforcement costs in 1999. First, we simply took the 1992 percentage of the total criminal justice system that went to illicit drug related issues and applied it to the 1999 total for the same expenditures. We calculated the estimate in this manner for all federal, state, and local enforcement and came up with the results in Table 5.4. Second, we used the results calculated by the Lewin Group in 2001. Those results are listed in Table 5.5. The difference was significant: more than $2.5 billion dollars. We assume that the Lewin Group used a more thorough methodology than we did in Table 5.1 and, thus, will use their estimate: $9,824 million.

FY99 Criminal Justice System Expenditures (CJSE)…...	21,469.94M
(*Attributable to illicit drugs only*)	
FY92 Percent CJSE attributed to Enforcement……..…….….	34%
FY99 Criminal Justice for Enforcement…….…….…..	$7,299.78M
(*Attributable to illicit drugs only*)	

Table 5.3. 1999 Enforcement Costs

Table 1. Total, direct, and intergovernmental justice expenditure and percent change, by level of government, fiscal years 1982-99

Year	Total* (Federal, State, and local direct)	Federal			State			Local		
		Total	Direct	Intergov-ernmental	Total	Direct	Intergov-ernmental	Total	Direct	Intergov-ernmental
Expenditure (in millions)										
1982	$35,842	$4,458	$4,269	$189	$11,602	$10,651	$951	$20,968	$20,922	$46
1983	39,680	4,944	4,844	100	12,785	11,709	1,076	23,186	23,127	59
1984	43,943	5,868	5,787	81	14,213	13,081	1,132	25,154	25,075	79
1985	48,563	6,416	6,279	137	16,252	14,903	1,349	27,462	27,381	81
1986	53,500	6,595	6,430	165	18,556	16,978	1,578	30,178	30,092	86
1987	58,871	7,496	7,231	265	20,157	18,465	1,692	33,265	33,175	90
1988	65,231	8,851	8,464	387	22,837	20,880	1,957	36,098	35,887	211
1989	70,949	9,674	9,204	470	25,269	23,009	2,260	38,825	38,736	89
1990	79,434	12,798	10,219	2,579	28,345	25,764	2,581	43,559	43,451	108
1991	87,567	15,231	12,106	3,125	31,484	28,493	2,991	47,075	46,968	107
1992	93,777	17,423	13,529	3,894	33,755	30,271	3,484	50,115	49,977	138
1993	97,542	18,591	14,429	4,162	34,227	30,696	3,531	52,562	52,417	145
1994	103,471	19,084	14,626	4,458	37,161	33,495	3,666	55,517	55,349	168
1995	112,868	22,651	16,741	5,910	41,196	37,360	3,836	58,933	58,768	165
1996	120,194	23,344	17,480	5,864	43,803	39,903	3,900	62,970	62,811	159
1997	129,793	27,065	20,524	6,541	46,444	42,353	4,091	67,083	66,916	167
1998	135,899	22,834	19,365	3,469	49,454	45,995	3,459	70,831	70,539	292
1999	146,556	27,392	22,148	5,244	57,186	49,965	7,222	74,830	74,443	387
Percent change										
1982-99	308.9%	514.4%	418.8%	2674.6%	392.9%	369.1%	659.4%	256.9%	255.8%	741.3%
Average annual	8.1%	10.6%	9.6%	20.3%	9.3%	9.0%	11.9%	7.3%	7.3%	12.6%

Note: Detail may not add to total because of rounding.
*Duplicative transactions between levels of government (intergovernmental transfers) are excluded from the total for all governments, the State total, and the local total. These intergovernmental expenditures consist of payments from one government to another and will show up as a direct expenditure of a recipient government. See the box on this page for further details.

Table 5.4. From *Justice Expenditure and Employment in the United States, 1999* [p.2]

Table C-4
The Economic Cost of Drug Abuse, 1992-2000
Costs for Other Effects
(in millions of 2000 dollars)

Table C-4
The Economic Cost of Drug Abuse, 1992-2000
Costs for Other Effects
(in millions of 2000 dollars)

Cost Categories	1992	1993	1994	1995	1996	1997	1998	1999	2000
Cost of Goods and Services Lost to Crime									
Criminal Justice System and Other Public Costs									
Police Protection	$5,348	$6,915	$7,618	$8,057	$7,898	$9,017	$9,501	$9,824	$10,189
Legal Adjudication	$2,716	$3,385	$3,742	$4,053	$3,898	$4,450	$4,689	$4,848	$5,028
State and Federal Corrections	$7,495	$8,974	$9,669	$10,955	$10,901	$11,104	$11,519	$11,748	$11,990
Local Corrections	$1,333	$1,638	$1,823	$1,951	$1,822	$1,836	$1,734	$1,634	$1,599
Federal Spending to Reduce Supply	$4,126	$4,349	$4,045	$4,130	$4,153	$4,901	$5,042	$5,997	$5,479
Private Costs									
Private Legal Defense	$365	$458	$493	$500	$483	$554	$573	$581	$591
Property Damage for Victims of Crime	$193	$269	$266	$243	$232	$221	$195	$181	$181
Social Welfare	$337	$418	$422	$412	$395	$300	$260	$238	$218
Total	**$21,912**	**$26,406**	**$28,078**	**$30,300**	**$29,782**	**$32,383**	**$33,513**	**$35,050**	**$35,274**

Source: Analysis by The Lewin Group, 2001.

Table 5.5. From *The Economic Costs of Drug Abuse in the United States – 1992-1998* [p.91]

2. Legal Adjudication

If we estimate the legal adjudication costs in the same manner we did for enforcement, then we calculate the percent of the total legal adjudication costs in 1992 attributable to illicit drug use and then determine the 1999 cost using the 1992 percent of the 1999 total. Table 5.6 applies the percent estimate for total 1992 criminal justice system expenditures for illicit drugs to the total for 1999.

FY99 Criminal Justice System Expenditures (*attributed to illicit drugs only*)	$21,469.94M
FY92 Percent attributed to Legal Adjudication	9%
FY99 Criminal Justice for Legal Adjudication	$1,932.30M

Table 5.6. 1999 Legal and Adjudication Costs

In this case, however, The Lewin Group has provided a more accurate estimate. Its calculation for the legal adjudication is $4,743 million, and this is the estimate we will use. Incidentally, states spent $3,626 million in 1998 for the legal adjudication of substance abuse offenders. As Figure 5.1 indicates, the greatest portion of this cost was spent in the criminal courts, and $114 million was spent specifically on Drug Courts.

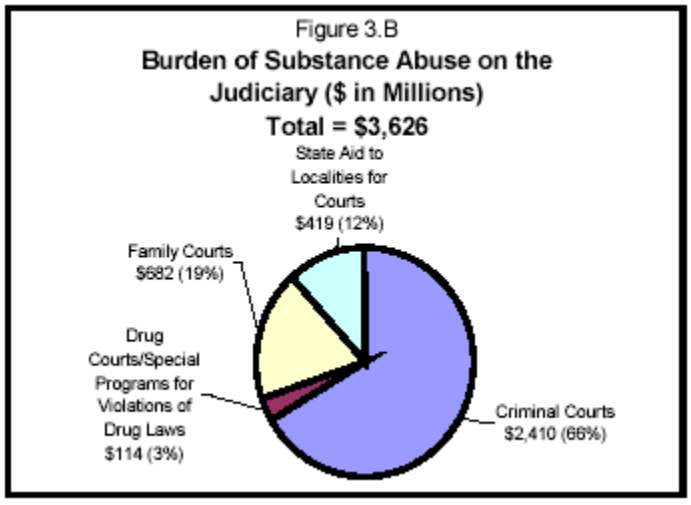

Figure 5.1 From *Shoveling Up: The Impact of Drug Abuse on State Budgets* [p. 16]

3. Federal, State, and Local Incarceration

Quite clearly, our nation's prison populations have grown substantially as a result of prohibition and the increasing emphasis on punishing both illicit drug suppliers and users.

> The Sentencing Reform Act of 1984 radically changed sentencing in drug cases. The new law required judges to sentence individuals based on mandatory guidelines, eliminating most judicial discretion. Congress enacted mandatory sentencing statutes as part of the Omnibus Drug Control Act of 1986. Federal judges have strongly opposed mandatory sentencing as have many other law enforcement experts. In fact, every judicial circuit, as well as the Criminal Law Committee of the Judicial Conference and the Federal Courts Study Commission have opposed mandatory minimum sentencing.
>
> The combination of stringent guidelines and mandatory sentencing along with similar harsh sentencing penalties adopted by most states has produced a burgeoning rate of incarceration in the United States. . . . Moreover, our nation's addiction to prison building has contributed to declines in education spending in many states. . . . (*The Effective National Drug Control Strategy,* 1999)

In 1992, the amount that federal, state, and local prisons spent on illicit drug law offenders was $7,196 million dollars, 33% of the total criminal justice system expenditures for drug law violations. If we apply this percent to the 1999 criminal justice system, then the expenditure for incarceration in 1999 is nearly $11,000 million. And, in fact, the Lewin Group estimated that the cost for state and federal correction in 1999 was $11,748 million and for local correction, $1,634 million. These two combined total $13.4 FY00 billion, $12.96 billion adjusted for inflation.

Table 5.7 describes the total number of inmates by offense and then the number of those inmates convicted of a drug-related crime. Looking *specifically* at the number of inmates convicted of a "Drug Law" violation is impressive; they rise from 300,007 in 1992 to 442,445 in 1999. By our own calculations, at a cost of $22,250 per inmate per year in 1999(*Federal Prison System—Salaries and Expenses 1975-2002*, 2002, p. 175)—some estimates are as high as $26,000 (CDC Facts, 2002)—that equates to nearly $9.84 billion dollars a year. If we add to this amount, as the table suggests, the number of inmates incarcerated as a result of a crime "attributable to drug abuse", then the

Number of Inmates by Offense
And the Number Attributable to Drug Related Crime, 1992-2000

Data Series	Percentage Attributable to Drug Abuse	1992	1993	1994	1995	1996	1997	1998	1999	2000
Estimated Number of State and Federal Prison Inmates										
Homicide		94,953	102,346	111,662	122,934	132,365	140,629	147,174	151,716	156,408
Assault		104,689	114,866	127,741	142,040	154,362	166,101	173,742	178,662	183,731
Sexual Assault		85,051	89,058	94,463	100,993	105,585	109,546	114,619	118,080	121,651
Robbery		147,532	155,585	165,938	177,916	186,809	195,263	204,679	211,444	218,484
Burglary		133,400	136,572	141,790	147,836	150,755	156,131	163,300	168,020	172,880
Larceny-Theft		71,924	74,671	78,792	83,021	85,632	90,111	94,232	96,802	99,446
Auto Theft		28,449	29,261	30,549	31,896	32,578	33,906	35,461	36,449	37,466
Drug Laws		300,007	318,131	340,504	363,576	381,363	404,470	425,747	442,445	460,087
Receiving Stolen Property		21,409	22,567	24,173	25,908	27,231	29,259	30,616	31,500	32,413
Total		1,266,135	1,339,778	1,436,238	1,541,389	1,621,527	1,719,125	1,802,187	1,860,520	1,921,272
Estimated Number of Jail and Prison Incarcerations Due to Drug Abuse										
Homicide	15.8%	15,003	16,171	17,643	19,424	20,914	22,219	23,253	23,971	24,712
Assault	5.1%	5,339	5,858	6,515	7,244	7,872	8,471	8,861	9,112	9,370
Sexual Assault	5.1%	4,338	4,542	4,818	5,151	5,385	5,587	5,846	6,022	6,204
Robbery	27.2%	40,129	42,319	45,135	48,393	50,812	53,112	55,673	57,513	59,428
Burglary	30.0%	40,020	40,971	42,537	44,351	45,226	46,839	48,990	50,406	51,864
Larceny-Theft	29.6%	21,290	22,103	23,322	24,574	25,347	26,673	27,893	28,653	29,436
Auto Theft	6.8%	1,935	1,990	2,077	2,169	2,215	2,306	2,411	2,479	2,548
Drug Laws	100.0%	300,007	318,131	340,504	363,576	381,363	404,470	425,747	442,445	460,087
Receiving Stolen Property	15.1%	3,233	3,408	3,650	3,912	4,112	4,418	4,623	4,757	4,894
Total		**431,291**	**455,493**	**486,202**	**518,795**	**543,248**	**574,095**	**603,298**	**625,358**	**648,544**

Source: Bureau of Justice Statistics (2001) *Prison and Jail Inmates at Midyear 1999.*

Table 5.7 From Prison and Jail Inmates at Midyear 1999, 2001 [p.78]

incarceration costs are truly staggering, nearly $14 billion! Attributing all of these costs to prohibition, however, would be reckless. A more realistic estimate might be 25% of the additional costs. That brings our total closer to $11 billion annually, closer to the Lewin Group estimate mentioned in the previous paragraph.

The range of estimates for incarceration costs in 1999 is fairly large. To determine the exact figures would require researching and applying inmate costs-per-year for every prison at every level of government and then matching those costs with the correct number of prisoners in each facility. Those calculations are beyond the scope of this thesis. Therefore, we have determined that a reasonable and conservative approximation of the actual costs for incarceration in 1999 is $10 billion.

4. Adding It Up: Criminal Justice System

The total expenditures in 1999 for Criminal Justice Systems are summarized below. In all of the research for this category of costs, the experts predict growth. Federal, state, and local governments continue to build more and larger prisons to house an ever-increasing prisoner population. And the percent of arrests attributed to drug-related activities is increasing as well—from 12.9% in 1992 to 15.2% in 1999. (Harwood et al, 2001, p. 81). Therefore, this component of the deadweight loss, like some of the others, is not constant from year to year after adjusting for inflation and growth, but rather continues to grow as the war wages on.

Criminal Justice System	**FY99$B**
Enforcement	$9.824
Legal Adjudication	$4.743
Incarceration	$10.000
Total	**$24.567**

D. HEALTH CARE COSTS

The health care costs incurred as a result of prohibition are complex and often difficult to discern from costs incurred as a result of irresponsible drug use. Yet, the difference between the two is critical in our analysis. How much of the total cost of

emergency room episodes attributed to "drug abuse," for example, should be included in our estimate of the deadweight loss? Or how many people who contracted AIDS by using an infected needle to shoot heroine would not have otherwise contracted the disease given the conditions of legalization? Certainly, a drug overdose that results in a visit to the emergency room or contracting AIDS from a dirty needle can occur under either prohibition or legalization. Additionally, costs such as drug use prevention programs and drug addition treatment will certainly exist under either situation and, thus, will not be considered in our calculations. The complexity and uncertainty of health care costs compel us to depend on the health care experts who collect this data annually for the government and their profession.

In our analysis of the health care costs for 1999, we relied heavily on three reports: *Shoveling Up: The Impact of Drug Abuse on State Budgets, The Economic Costs of Drug Abuse in the United States 1992-1998,* and *The Economic Costs of Alcohol and Drug Abuse in the United States – 1992.* In our opinion, these reports do an outstanding job of reporting the health care costs of drug abuse. Of the four major categories of health care costs (Community-Based Special Treatment, Federal Specialty Treatment Costs, Support, and Medical Consequences), we conservatively selected costs only from Medical Consequences. We did so because we were reasonably certain that the costs in this category exist *only* under the condition of prohibition.

1. Medical Consequences

> Because there is no quality control in the black market, prohibition also kills by making drug use more dangerous. Illegal drugs contain poisons, are of uncertain potency, and are injected with dirty needles. Many deaths are caused by infections, accidental overdoses, and poisoning. . . . (Ostrokowski, 1989)

a. Specific Disease Cost

We selected three of the four possible specific disease costs to include in health care estimates. Tuberculosis, HIV/AIDS, and Hepatitis B and C are contracted through irresponsible methods of drug injection—methods that would certainly improve under the conditions of legalization. Table 5.8 summarizes the costs of these diseases as

reported by the Lewin Group. Below we have included important footnotes from that report that are relevant to the values they report:

> The real change in health care costs attributable to tuberculosis (TB) was measured as the change in the number of cases of TB that were attributable to injecting or non-injecting drug use according to the Center for Disease Control (CDC). . . . [T]he percentage of cases attributable to injecting or non-injecting drug use was only available for 1996 through 1999. . . .
>
> The portion of HIV/AIDS spending attributable to drug abuse was estimated based on data from the CDC. The CDC monitors the exposure category of each reported case. In 1996, 37 percent of individuals living with AIDS had an exposure category related to intravenous drug use (IVDU). Thus, 37 percent of the 7.25 billion or $2.68 billion are assumed to be related to drug abuse.
>
> . . . The real change was based on the change in the number of hepatitis cases attributed to IVDU between 1992 and 1998. . . . Between 1995 and 1998 the number of hepatitis cases associated with IVDU declined at a five percent annual rate. . . . [T]he number of cases was assumed to remain at the 1998 level in 1999 and 2000. (Harwood et al, 2001, pp. 28-30)

It may be a stretch to attribute all of these special disease costs to prohibition. But attributing half of the costs is at least conservative. To attribute any less would be to ignore the reality of legal drug use care that exists now; namely, precautions, specific directions for use, and dosage information. There is a factual basis for our. For example, "In Hong Kong, where needles are legal, there are no cases of drug-related AIDS…" (Ostrowski,. 1998,p. 24) Ostrowski goes on to say that legalization prevents the spread of AIDS by providing for clean, inexpensive needles, inexpensive tablet forms of drugs, and eliminating the need for "shooting galleries" and sharing needles. Table 5.8 illustrates the total costs; we will use 50% of these.

Special Disease Costs	**FY99$M**
Tuberculosis	$22
HIV/AIDS	$3,822
Hepatitis B and C	$459
TOTAL	**$4,303**

Table 5.8 Special Disease Costs

b. Medical Expenses for Victims of Violent Crimes

The total medical expenses in 1992 for victims of violent crimes attributed to illicit drugs were estimated at $105 million. (Lewin Group, 2001) There is no readily available and comprehensive estimate for 1999. Therefore, adjusting only for inflation using the medical services CPI, the cost for medical expenses in 1999 would have been $124.61 million. Bouchery and Harwood estimated that two-thirds of these crimes were committed in the act of obtaining or distributing drugs and, therefore, can be reasonably associated with prohibition—not simply with drug use. Thus, the final estimate for medical expenses related to victims of violent crimes is $83.07 million.

2. Adding It Up: Health Care Costs

The total values of health care costs as a result of prohibition are listed below. Admittedly, these costs represent only a fraction of the total health care costs associated with what is commonly termed "substance abuse" by the major studies we used. It is important to note that most federal, state, and local funds are spent on prevention and treatment for substance abuse. Table 5.9 is an extract from *The Economic Cost of Drug Abuse—1992-1998*. The data in it show some interesting trends. For example, the specific disease costs we included in our analysis (HIV/AIDS, Tuberculosis, etc.) have all decreased since 1992. That is the good news. The costs for victims of violent crimes, however, have increased. Of most interest is the huge increase in Hospital and Ambulatory Care costs. We do not include any of these in our analysis, though a percentage of them must be related to prohibition.

Health Care Cost	**FY99$M**
Medical Expenses for Victims of Violent Crimes	$83
Tuberculosis	$11
HIV/AIDS	$1911
Hepatitis B and C	$230
TOTAL	**$2,235**

E. PRODUCTIVITY LOSSES

When an innocent bystander is killed by a wayward bullet during a territorial battle between two rival drug-dealing gangs, or when a person is arrested and sentenced to five years in prison for growing marijuana for home use, society suffers from their absence. The main part of society that suffers, in most cases, is the drug user or seller himself. These losses take the form of lost potential productivity from wages, taxes, and other tangible or intangible contributions to society as a whole. Because both of the preceding examples are a direct result of prohibition, our analysis includes the productivity losses realized. We accept that drug addicts cost society each year in productivity losses, job accidents as a result of impaired abilities, and other dysfunctions related to drug use, and we do not include those costs in our analysis. Additionally, however, we do not make an effort to offset the productivity losses to society from prohibition with the productivity losses to society from drug use.

We again rely heavily on the figures reported by the Lewin Group, NIDA, and the ONDCP. The subcategories used in these studies were: lost productivity due to premature death; crime careers; incarceration; victims of crime; institutionalization/hospitalization; and drug-abuse-related illnesses. Of these six categories, only the first four are relevant for our study—we expect at least the same loss of productivity due to institutionalization/hospitalization and drug-abuse-related illness under legalization.

1. Premature Death

The components used to calculate the cost of lost production due to premature death are deaths by diagnosis, age and sex, the percent of deaths attributed to drug abuse by diagnosis, and estimated lost lifetime productivity per death by age and sex. (Lewin Group, 2001) Both the Lewin Group and Harwood et al (1998) use the same list of diagnoses and other factors determining cause of death. Although this list is detailed and pointed, it does not distinguish between legal and illegal drugs. For example, one cause—"accidental poisoning by drugs, medicaments, and biologicals"—does not distinguish between legal or illegal drugs, though we can safely assume it includes deaths attributed to overdosing. Of these overdoses, however, we can only speculate as to the

Cost Categories	1992	1993	1994	1995	1996	1997	1998	1999	2000
Community-Based Specialty Treatment	$4,144	$4,445	$4,576	$4,565	$4,872	$4,915	$5,153	$5,369	$5,594
Federally-Provided Specialty Treatment									
Department of Defense	$17	$10	$6	$6	$5	$5	$5	$5	$6
Indian Health Services	$31	$39	$36	$35	$36	$33	$33	$33	$33
Bureau of Prisons	$21	$20	$20	$20	$21	$21	$22	$26	$28
Department of Veterans Affairs	$568	$639	$680	$729	$643	$628	$434	$449	$439
Support									
Federal Prevention	$747	$734	$734	$697	$608	$697	$757	$799	$826
State and Local Prevention	$108	$109	$105	$112	$88	$90	$89	$87	$85
Training	$59	$60	$61	$61	$62	$62	$63	$64	$64
Prevention Research	$191	$194	$201	$201	$230	$245	$261	$292	$323
Treatment Research	$236	$285	$291	$292	$307	$332	$343	$391	$419
Insurance Administration	$271	$328	$329	$305	$294	$272	$299	$330	$367
Medical Consequences									
Hospital and Ambulatory Care Costs	$682	$664	$765	$852	$949	$903	$1,013	$1,025	$1,039
Special Disease Costs									
Drug-Exposed Infants	$494	$500	$505	$506	$508	$509	$525	$532	$539
Tuberculosis	$36	$36	$35	$33	$31	$28	$25	$22	$20
HIV/AIDS	$4,490	$4,023	$3,619	$3,248	$2,911	$3,218	$3,527	$3,822	$4,144
Hepatitis B and C	$561	$470	$481	$510	$427	$466	$454	$459	$466
Violent Crime	$112	$168	$170	$155	$148	$140	$133	$126	$128
Health Insurance Administration	$362	$372	$345	$303	$262	$255	$300	$335	$380
Total	**$13,132**	**$13,095**	**$12,959**	**$12,630**	**$12,402**	**$12,821**	**$13,435**	**$14,165**	**$14,899**

Table 5.9. From *The Economic Costs of Drug Abuse in the United States – 1992-1998* [p.88]

percentage caused by prohibition factors—i.e., unknown purity strengths, poisonous additive, or improper dosing. Table 5.10 lists the causes of death and associated numbers developed by the National Center for Health Statistics (NCHS) and used by the studies we quote. Of these, we selected only the following causes of death for our calculations:

Direct Primary Causes: Accidental overdose of psychoactive drugs:

- Opiates and related narcotics.

- Injury Undetermined whether accidental or purposely inflicted:
  - Homicide and injury inflicted purposely by other persons.

Other Causes:

- Tuberculosis.
- Hepatitis C.
- Hepatitis B.
- AIDS.

A productivity loss is calculated for each incident of death based on the individual. That information was not available to us and, therefore, we made approximations based on the percentage of the total deaths and total productivity loss. In 1998, NCHS reported 19,227 deaths related to drug abuse. The total number of deaths from the causes we included in our analysis was 9,872, or 51.3% of the total. Accordingly, these deaths should represent approximately 51.3% of the total cost of productivity loss due to premature death. In 1999, the NCHS reported that the number of drug related deaths was 19,102—very similar to 1998—so we assume that the numbers are similar for each sub-category, as well. (Hoyert et al, 2001, p.10) The Lewin Group reported that the cost of productivity losses as a result of premature death in 1999 was $17,823 FY00M. Applying 51.3% and adjusting to FY99 dollars, the total cost is $8,845.3 million. Since it is again difficult to specifically attribute all of these deaths to prohibition, however, we will conservatively use half of the total, $4,422.65 million.

Number of Deaths Related to Drug Abuse, 1992-1998

Cause of Death	ICD-9 Code	Percent Attributable to Drug Abuse	Number of Deaths Attributable to Drug Abuse						
			1992	1993	1994	1995	1996	1997	1998
DIRECT PRIMARY CAUSES									
Drug psychosis	292	100%	13	3	10	9	8	4	11
Drug dependence	304	100%	309	333	267	301	335	273	264
Nondependent abuse of drugs	305.2-305.9	100%	777	806	932	1,104	1,276	1,251	1,336
Drug withdrawal syndrome in newborn	779.5	100%	6	0	1	0	0	0	3
Accidental overdose of psychoactive drugs									
Opiates and related narcotics	E850.0	100%	1,279	1,728	1,732	1,904	2,075	2,377	2,718
Aromatic analgesics, not elsewhere classified	E850.2	100%	69	88	90	85	80	107	94
Other non-narcotic analgesics	E850.7	100%	0	0	0	0	0	0	0
Other	E850.8	100%	167	149	182	181	179	178	175
Unspecified analgesics and antipyretics	E850.9	100%	2	1	4	3	2	7	9
Barbiturates	E851	100%	21	17	15	17	19	24	16
Other sedatives and narcotics	E852	100%	11	17	10	13	15	9	8
Tranquilizers	E853	100%	65	11	63	73	82	94	107
Other psychotropic agents (i.e. antidepressants)	E854	100%	289	315	355	350	344	393	334
Other drugs acting on the central and autonomic nervous system	E855	100%	1,113	1,183	1,393	1,402	1,411	1,336	1,540
Agricultural and horticultural chemical pharmaceutical preparations other than plant foods and fertilizers	E863	100%	18	16	11	14	16	12	8
Accidental Overdose of Drugs and Medicaments									
Salicylates	E850.1	100%	56	47	37	42	47	27	32
Pyrazole derivatives	E850.3	100%	2	1	1	1	1	2	2
Antirheumatics	E850.4	100%	3	3	6	5	4	4	7
Other non-narcotic analgesics	E850.5	100%	79	77	96	99	102	111	104
Accidental poisoning by antibiotics	E856	100%	55	43	44	46	47	48	39
Accidental poisoning by other anti-infectives	E857	100%	5	9	11	9	6	8	4
Hormones and synthetic substitutes	E858.0	100%	18	9	26	24	21	29	21
Primarily systemic agents	E858.1	100%	44	60	51	47	42	49	57
Agents primarily affecting blood constituents	E858.2	100%	33	34	27	32	36	53	51
Agents primarily affecting cardiovascular system	E858.3	100%	218	213	244	236	227	195	194
Agents primarily affecting gastrointestinal system	E858.4	100%	3	5	3	4	5	1	3
Water mineral and uric acid metabolism drugs	E858.5	100%	75	74	72	58	44	42	33
Agents primarily acting on the smooth and skeletal muscles and respiratory system	E858.6	100%	8	18	15	17	18	12	27
Agents primarily affecting skin and mucous membrane, opthalmological, otorhinolaryngological, dental drugs	E858.7	100%	7	7	11	11	10	9	4
Other specified drugs	E858.8	100%	1,328	1,902	1,981	1,997	2,012	2,163	2,465
Unspecified drug	E858.9	100%							
Heroin, methadone, other opiates and related narcotics, and other drugs causing adverse effects in therapeutic use.	E935.0-E935.2, E937-E940	100%	27	20	20	22	23	44	60
INJURY UNDETERMINED WHETHER ACCIDENTAL OR PURPOSELY INFLICTED									
Analgesics, antipyretics, and antirheumatics	E980.0	100%	491	689	687	712	737	857	899
Barbiturates	E980.1	100%	13	7	10	8	6	10	8
Other sedatives and hypnotic	E980.2	100%	8	3	9	8	6	4	8
Tranquilizers and other psychotropic agents	E980.3	100%	159	168	180	173	166	178	171
Other unspecified drugs and medicinal substances	E980.4	100%	478	618	657	659	661	780	846
Unspecified drug or medicinal substance	E980.5	100%	252	257	291	290	288	371	366
Other and unspecified solid or liquid substances	E980.9	100%	63	50	32	36	39	50	48
Homicide and injury inflicted purposely by other persons	E960-E969	10%	2,514	2,565	2,455	2,259	2,063	1,949	1,789
OTHER CAUSES									
Tuberculosis	010-018	4.5%	77	73	67	60	54	52	50
Hepatitis C	various	20%	900	214	326	404	476	545	691
Hepatitis B	various	30%	2,700	312	336	323	340	326	329
AIDS	various	32%	10,741	12,060	13,475	13,794	9,959	5,283	4,295
Total			24,476	24,206	26,234	26,823	23,283	19,268	19,227

Source: National Center for Health Statistics (1993-1998).

Table 5.10. From Harwood et al, 2001 [p.76]

2. Crime Careers

"Criminals" engaged in trafficking, selling, distributing, or otherwise illegal activities as defined by illicit drug laws have chosen their careers in crime in lieu of legal careers. In addition, market productivity is lost through individuals who "obtain income for illicit drugs from other criminal activities, such as acquisitive crimes, consensual crimes (e.g., gambling or prostitution), and receiving and trafficking in stolen property."(Lewin Group, 1998) That said, however, there is an important difference between consensual crimes and receiving and trafficking in stolen property. Time spent on consensual crimes *is productive* because it produces goods or services for people who want to buy them (again, prostitution or illicit drugs). On the other hand, receiving and trafficking stolen goods *is unproductive* because it is time spent simply rearranging stolen property. Assuming that, in the absence of prohibition, those people engaged in non-productive crime would contribute to society through legitimate jobs and professions, their absence adds to the indirect costs of the drug war.

In 1992, the Lewin Group estimated the productivity loss due to crime careers at $19.2 billion. They calculated this estimated based on:

> . . . the estimate that there were about 1.7 million heavy drug users in the United States in 1992 (Rhodes et al, 1995). The prior studies estimated that there were about 1.2 million heavy drug users. Following the earlier studies, it was estimated that about 600,000 of them withdrew from the labor market to pursue predatory crime and/or drug dealing (estimate derived from analysis of the Treatment Outcomes Prospective Survey [TOPS] reported in Harwood et al [1984]). This loss is based on the models of criminal behavior that Goldstein (1985) has labeled "economic compulsive" and "systemic": The crime is committed to support one's use of expensive drugs, or one engages in the drug distribution system primarily to earn a living. (Lewin Group, 2001)

In 2001, the Lewin Group again calculated the value for productivity losses due to (unproductive) crime careers, determining that the cost in 1999 was $33,515 in FY00M. Assuming that their calculation was correct and adjusting down for inflation, that equals $32,422.97 million in 1999. *That* is significant.

3. Incarceration

The loss of productivity due to incarceration is much the same as the loss of productivity from victims of crime. Quite simply, when people are in prison, they cannot legitimately contribute to society because their income- (and tax-) generating potential and other tangible or non-tangible contributions cannot be realized. The Lewin Group calculated its estimate based on the number of prisoners and the average rates of employment and average productivity/wage rates. Using average productivity and wage rates may be controversial, however, because:

> . . . many of these individuals might still have had poor success in the legitimate labor market. This is very possibly related to their problems with alcohol and drug abuse. . . . By this line of logic, the loss of potential market plus non-market productivity might be much less than the value for the general population because it is anticipated that they would have higher than average unemployment rates and/or lower than average wage rates. (Lewin Group, 2001)

and,

> . . . the economic impact of consensual criminal activities, such as drug activities, prostitution, and illegal gambling, is less specific than that of predatory crime. Although the legitimate economy incurs a loss, the individuals engaged in the "underground economy" are generating income for themselves. The estimated loss of legitimate potential earnings may be completely offset. Government may still realize tax revenue from sales and excise taxes on legitimate goods and services purchased by drug abusers. The loss associated with dropping out of the legitimate economy may be primarily from losses of income taxes and employment-related contributions to social insurance trust funds. (Harwood et al, 1998)

Summarizing again *from The Economic Costs of Drug Abuse in the United States 1992-1998*, the total productivity loss due to incarceration for drug-related crimes in 1999 was $33,515 FY00M (the increase in incarcerations is detailed in Table 5-11). In light of the argument presented above and in the spirit of obtaining a conservative estimate, we

Percentage of Arrests in Local Jails and Persons Under Incarceration in State and Federal Prison for Drug Related Crimes, 1992-1999

Data Series	1992	1993	1994	1995	1996	1997	1998	1999
Local Jails								
Number of Individuals Arrested for Drug Related Crime (in thousands)[1]	1,821	1,870	2,111	2,241	2,244	2,312	2,219	2,136
Total Number of Individuals Arrested (in thousands)[2]	14,075	14,036	14,649	15,120	16,341	15,284	14,528	14,031
Percentage of Individuals Incarcerated for Drug Related Crime	12.9%	13.3%	14.4%	14.8%	13.7%	15.1%	15.3%	15.2%
State and Federal Prison								
Number of Individuals Incarcerated for Drug Related Crime[1]	290,970	311,516	335,114	362,549	384,741	400,895	422,341	440,260
Total Number of Individuals Incarcerated[2]	821,551	879,974	949,764	1,034,345	1,103,035	1,152,046	1,209,725	1,254,577
Percentage of Individuals Incarcerated for Drug Related Crime	35.4%	35.4%	35.3%	35.1%	34.9%	34.8%	34.9%	35.1%

Table 5.11. From *The Economic Costs of Drug Abuse in the United States – 1992-1998* [p.82]

assess only 75% (arbitrary) of this total and adjust down for inflation. Thus, the total loss of productivity from incarceration was $24,327.23 million in 1999.

In our opinion, there is a disturbing trend in drug offense incarcerations. Not only are the productivity losses exorbitant, as indicated in the previous paragraph, but these losses also are increasing at an alarming rate, as more and more drug law offenders are arrested, convicted, and sent to prison. Below, we provide some startling facts drawn from a variety of government reports, facts that demonstrate the seriousness of the unintended consequences of the drug war.

- In 1996, an estimated 109,200 jail inmates were held for a drug offense, an increase from 87,400 in 1989 and 20,400 in 1983. From 1990 to 1999 the number of drug offenders in State prison increased by 69%, from 148,600 to 251,200. Source: BJS, *Prisoners in 2000*, NCJ 188207, August 2001.

- Prisoners sentenced for drug offenses constituted the largest group of Federal inmates (61%) in 1999, up from 53% in 1990. On September 30, 1999, Federal prisons held 68,360 sentenced drug offenders, compared to 30,470 at year end 1990. Source: BJS, *Prisoners in 2000*, NCJ 188207, August 2001.

4. Victims of Crime

This estimate is based on the number of hours lost by victims of crime attributed to drug abuse. The basis for this work was accomplished by Harwood et al (1992) in the report *The Economic Costs of Alcohol and Drug Abuse in the United States – 1992.* Tables 5.12 and 5.13 list the components used to calculate this loss.

Hourly Compensation Index, 1992-2000

	Actual								Projected
Data Series	1992	1993	1994	1995	1996	1997	1998	1999	2000
Hourly Compensation Index	100.0	102.4	104.5	106.7	110.1	114.2	120.3	126.3	132.2

Source: U.S. Department of Labor, Bureau of Labor Statistics. (2000) *Annual Indexes of Productivity, Hourly Compensation, Unit Costs, and Prices, Selected Years.*

Table 5.12. From *The Economic Costs of Drug Abuse in the United States 1992-1998*, 2001, [p.35]

Average Number of Days Lost per Victim, 1992

Crime	Average Work Days Lost
Rape	4.6
Assault	3.7
Robbery	4.4
Burglary	1.7
Larceny	1.7
Auto Theft	2.7

Table 5.13. From Harwood et al, 1998

The Lewin Group used the updated Average Number of Days Lost per Victim figures and applied the Hourly Compensation Index for 1999 to arrive at a total cost of $2,164 FY00M. We simply adjusted this number down for inflation and arrived at a cost in 1999 of $2,093.49 million. In order to remain conservative, we again use only 50% of this total, $1,046.75 million.

5. Adding it up: Productivity Losses

Table 5.14 summarizes the total productivity losses attributed to prohibition of drugs.

PRODUCTIVITY LOSS CATEGORY	**FY99$M**
Premature Death	$4,422.65
Crime Careers	$32,422.97
Incarceration	$24,327.23
Victims of Crimes	$1,046.75
Total	**$62,219.60**

Table 5.14. Total Productivity Losses

F. OTHER COSTS

The other costs of prohibition are both pragmatic and philosophical. Corruption, for example, in the form of bribes and payoffs to law enforcement officials, and real

assaults on civil liberties, both take their toll on society. Our analysis of 'other costs' of prohibition generated more questions, at times, than it did answers. Consider our dilemma with a recent example from Dallas, Texas.

A Mexican immigrant who owned a small auto repair shop was arrested for possession and intent to sell a large quantity of cocaine. One day, while he worked in his shop, narcotics officers from the Dallas Police Department approached him, stating that he was under arrest. When he asked them what the charge was, they responded simply, "You know." When the man was taken outside to be placed in a car, he noticed other agents removing "bricks" of white powder from his personal truck and field-testing it in front of his shop. He evidently had no idea where those bricks came from.

Fortunately for this man, his public defender was both very smart and quite lucky. Sensing that her client did not fit the profile of a big-time drug dealer (he lived very modestly with three children and a wife in a small home with no frills), she ordered a polygraph for the man. Not surprisingly, he passed with flying colors. The surprise came when the paleographer replied curiously that he had another man in for a polygraph a couple of weeks before who had been asked similar questions. Oddly, the narcotics agents who arrested the second man had also replied, "You know," when asked what the charges were. The coincidence was too much for the lawyer, and she began her own investigation.

She discovered that not only were the "drugs" evidently planted, but also the "drugs" turned out to be gypsum (dry wall ingredient). Unfortunately, it turned out, 45 or more people were arrested, convicted, and sent to prison for possession of "cocaine" because the narcotics officers never sent the "drugs" to an independent lab for verification before trial. Some of these victims—poor working immigrants in most cases—spent their life savings or went into great debt defending their innocence. Even worse, some who could not afford to defend themselves simply pled to lesser charges and went to prison anyway.

The Dallas Police Department is currently under investigation for these incidents. What could possibly motivate these officers to frame innocent people and watch them go to prison? Or more pointedly, how do we calculate these costs? The simple answer is that we don't. But it is important to bring them to light in our study.

Both the studies we have referenced extensively in this chapter—*The Economic Costs of Alcohol and Drug Abuse in the United States – 1992* and *The Economic Costs of Drug Abuse in the United States 1992-1998*—list two more categories of drug abuse (prohibition) costs that are relevant to our study. They are the cost of crime (property loss, damage, etc.) and the cost of private legal defense services.

1. Cost of Crime (Property Damage)

The cost of crime refers to the total value of goods and services damaged, destroyed, or otherwise lost as a direct result of prohibition. The Lewin Group used the following causal estimates in its calculations:

- Drugs are responsible for about 25 to 30 percent of property crime and four to five percent of violent crime (the causal values are slightly different for the specific offenses within types).
- All "drug-defined" crimes (e.g., dealing and possession) are so attributed.

However, most studies include *all* crimes committed where drugs or drug use were involved. Therefore, we cannot simply report the figure of 25 to 30 percent of property crime for 1999 as our total for the cost of crime caused by prohibition. The property lost as a result of prohibition is not singled out. For example, a woman who robs a liquor store while under the influence of marijuana would be counted in the statistics in most of the studies conducted; yet those costs cannot be considered a direct result of prohibition. However, the destruction of a storefront by bullets fired during a drug war turf battle would certainly be a cost of prohibition.

A conservative estimate would be that 50% of the property damage connected to drug abuse in *The Economic Costs of Drug Abuse in the United States 1992-1998* is a result of prohibition. That report indicated a cost of $181 FY00 million. Applying 50% and adjusting down for inflation yields $87.55 million in 1999.

2. Personal Legal Defense

We include the costs of defending drug law offenders because they are, for the most part, avoidable, like the other indirect costs we have discussed under the conditions of legalization. In this category, we made no adjustments to the methods or the calculations performed by Harwood et al and The Lewin Group, but simply adjusted their numbers to fiscal year 1999. The cost of private legal defense attributable to drug abuse was calculated based on three components:

- Total annual revenue for legal services as reported by the Bureau of the Census;
- the percentage of lawyers practicing criminal law; and
- the percentage of arrests attributed to drug abuse.

> The Bureau of the Census reports revenue for legal services annually. . . . Between 1992 and 1997, total annual revenue for legal services increased four-percent annually. To project annual revenue for 1998 through 2000, revenues were assumed to continue to grow at a four-percent annual rate. The criminal law section represents 2.6 percent of American Bar Association members. Based on this, the overall percentage of lawyers practicing criminal law was assumed to be 2.6 percent and is constant across the years. . . . [T]he annual revenue for legal services is multiplied times 2.6 percent (the percentage of lawyers practicing criminal law) and the percentage of arrests attributed to drug abuse to derive the estimate of private legal defense spending. (Lewin Group, 2001, p. 41)

The Lewin Group calculated the cost for private legal defense in 1999 at $581 FY00M. This total, adjusted down for inflation, is $562.07 million.

G. SUMMARY

This chapter has presented the major indirect components of the deadweight loss caused by the drug war. We alluded to a few in the previous section (e.g., corruption of government officials). Consider the amount of time that law enforcement agencies devote to fighting the war on drugs, and then consider redirecting those efforts to preventing or solving other crimes against society. We examine this type of opportunity cost in our final chapter.

To conclude this chapter, we present Table 5.15, which tabulates the components we chose to include in our study. In our final chapter, we add this total to the direct

component of the deadweight loss in order to illustrate the enormous opportunity costs associated with prohibition.

TOTAL INDIRECT COMPONENT COSTS

COST CATEGORY		FY1999 ($ Million)
REDUCTION OF SUPPLY		
Federal	5,867.50	
State and Local	574.00	$ 6,441.50
CRIMINAL JUSTICE SYSTEM		
Enforcement	9,824.00	
Legal Adjudication	4,743.00	
Correction	10,000.00	$ 24,567.00
HEALTH CARE		
Specific Disease Cost	2,152.00	
Medical Expenses for Victims of Crime	83.00	$ 2,235
PRODUCTIVITY LOSSES		
Premature Death	4,422.65	
Crime Careers	32,422.97	
Incarceration	24,327.23	
Victims of Crime	1,046.75	$ 62,219.60
OTHER COSTS		
Cost of Crime	87.55	
Personal Legal Defense	562.07	$ 649.62
TOTAL INDIRECT COMPONENT COSTS		$ 96,112.72

Table 5.15. Total Indirect Component Costs

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VI. OPPORTUNITIES

A. INTRODUCTION

Today, a number of organizations advocating the legalization of illicit drugs exist throughout the world. A short list of American drug reform groups includes Common Sense for Drug Policy, Drug Reform Coordination Network, DrugSense, FamilyWatch, Efficacy, ReconsiDer Forum of Drug Policy, Multi-Disciplinary Association for Psychedelic Studies, and finally, the National Organization for the Reform of Marijuana Laws. These organizations support the legalization of drugs for a variety of reasons and to varying degrees, ranging from harm reduction and strict regulation to economic efficiency and total free-market legalization.

We see legalization as a means to realize foregone opportunities, which, in our opinion, are more beneficial to society and certainly more cost-effective than prohibition. Some examples of these opportunities are shoring up Social Security, improving the U.S military, enhancing America's educational system, stemming the spread of AIDS and other deadly diseases, combating world hunger, realizing a tax break, and a number of other noble and attainable possibilities. In this chapter, we sum the direct and indirect components of the deadweight loss, calculate how much of this loss would actually become available annually, and then illustrate several alternative uses of these funds.

B. TOTAL DEADWEIGHT LOSS

In the preceding two chapters, we analyzed the markets of the four most commonly used illicit drugs in America: cocaine, heroin, marijuana, and methamphetamine. We estimated that the direct and indirect costs uniquely attributable to America's prohibitive drug policies totaled more than $186.4 billion in 1999—$90.29 billion in direct DWL and $96.1 billion in indirect DWL. Adjusted for inflation into 2002 dollars, this equals more than $199 billion! To put that number into perspective, the 2002 total outlay for the Social Security Program, by any measure the largest portion of the federal budget, was $443 billion. The budget outlay for National Defense in the same year was only $285 billion.

The end of prohibition would result in the direct and indirect infusion of $186.4 billion annually into the American economy. The funds spent on fighting the supply-side of the drug war (the DEA budget, for example, or drug violator incarceration costs) would be entirely recaptured and available. We estimate, however, that of the total deadweight loss from payment of risk and under-consumption, we can only recapture about $6.7 billion annually via taxation. These amounts represent the direct infusion into the economy. The remainder of the DWL would be returned to the American people indirectly via increased governmental services, tax breaks, and other "public goods" and in the real reduction of the negative externalities or unintended consequences of the drug war.

In fact, taxing recreational drugs has two "positive" impacts on society. First, it generates revenues that could be earmarked for any number of uses—we discuss some in the following pages. Second, taxes, by increasing the real price of these drugs, would reduce the consumption of drugs—not unlike the way prohibition did. This may not appease some of those who read our analysis and are troubled by the portion of deadweight loss attributable to under-consumption. Drugs, we predict, could reasonably be taxed at 200% of their legal costs, which we calculated in Chapter IV, without fear of resulting black markets. This tax revenue combined with the direct savings that results from eliminating most of the indirect DWL components—loss of productivity is the only exception—equates to about $41 billion a year. It is this money that we assert would be available for alternative uses.

We assume that there will be cost increases in some areas under legalization—e.g., prevention, treatment, and education. However, we believe that money spent in prevention and treatment is much more beneficial to the individual and society than money spent fighting the supply side. In fact, a cocaine study by the Rand Corporation's Drug Policy Research Center shows that, for every dollar invested in drug treatment, to get comparable results we would have to spend seven dollars in domestic law enforcement, ten dollars in border patrol interdiction programs, or twenty-three dollars in source-country elimination programs. (Rydell, 1994)

Using the after-tax prices listed in Table 6.1 and the average elasticities calculated for each of these drugs in Chapter IV, we calculated potential tax revenues of

more than $6.7 billion in 1999 dollars. With the opportunity for taxation and the redirection or elimination of currently earmarked drug war revenues, legalization represents nearly $41 billion per year in new opportunities for governments in the United States.

Legal Drug Market	Price (in 1999 dollars)
1 gram of cocaine	$ 11.82
1 gram heroin	$25.47
1 joint marijuana	$ 3.30
1 dose methamphetamine	$ 2.00

Table 6.1. The Legal Drug Market - including realistic taxation rate.

Close examination of Table 5.15 at the end of Chapter V supports a realistic estimate that approximately $34 billion would become available to U.S. governments if drugs were legalized. These funds include the budgets of agencies such as the DEA, the direct costs of drug-related medical expenses, and costs of drug-related incarceration and legal representation, as examples. Therefore, we predict that there would be, realistically, an additional $41 billion available for government use if America's prohibitive drug policies were repealed. Again, the remaining deadweight loss is returned to Americans via reductions in prohibition-related phenomena.

C. OPPORTUNITIES

1. Defense

We examine Department of Defense initiatives and opportunities that America is currently foregoing and then look at a few opportunities that this level of funding could facilitate. The magnitude of defense spending required to stem the flow of illicit drugs into the United States is almost beyond comprehension. In fact, in 1987, the Department of Defense presented Congress with an analysis outlining the military force it would

require to secure U.S. borders against drug trafficking. The report predicted it would take a force made up of 96 infantry battalions, 53 helicopter companies, 210 patrol ships and 110 surveillance aircraft. (Gonsalves, 2000) The report went on to say that all of these operational units would also require logistical support units, which amounted to hundreds of additional personnel and their equipment.

Joseph Miranda, former instructor at the U.S. Army JFK Special Warfare Center and editor of *Strategy and Tactics* magazine, stated on the record that "[t] he end result is that [this] force would require at least 500,000 or so personnel to function in the field." (Gonsalves, 2000) But when you add it all up, the drug war force (the U.S. military, National Guard, Border Patrol, U.S. Customs Service, etc.) consists of only about 12 battalions—only one-eighth of the 96 battalions that the Defense Department says would be necessary. (*Gonsalves, 2000)* This is not surprising, considering the financial investment that would be required to fund a counter-drug force of this size. To put this into perspective, the total end-strength of the U.S. Army is only 480,000 personnel, and the current U.S. Army Modernization Plan estimates that only 76% of this force, or approximately 365,000 men and women, are "operational." (Army Modernization Plan 2002, Appendix F) So, according to these statistics—taken from the 1987 DoD report to Congress—America would require an entirely new service roughly 5% larger than the current 480,000-person Army just to combat the flow of illicit drugs.

Since the National Defense Authorization Act of 1989, the DoD has been designated the "single lead agency" for drug interdiction under federal law, with the Coast Guard designated as the lead agency for the interdiction and apprehension of illegal drug traffickers on the high seas. As a result, the U.S. military has become entrenched in the drug war and has enlisted Latin America's militaries as key partners in our drug-control strategy. The White House Office of National Drug Control Policy describes DoD's involvement in the war on drugs as follows:

> DOD maintains a robust counterdrug presence abroad. In its attempt to stem foreign production of illegal drugs, DOD supports comprehensive foreign intelligence collection and analysis programs that assist foreign nations and international and interagency efforts in their attempts to halt, dismantle and arrest drug cartel kingpins and their organizations. Furthermore, DOD is involved in supporting programs that

> augment the efforts of participating nations to interdict cocaine, perform riverine operations [interdiction operations conducted in river valleys using the river as the primary mode of transportation], and provide participating nations' intelligence and assistance in planning on the operational level. DOD maintains extensive maritime air surveillance capabilities in the form of a tracking system and various aircraft and also engages in surveillance operations in various countries. These activities also include supporting law-enforcement agencies that have counterdrug responsibilities.
>
> Domestically, DOD's counterdrug activities are a mix of interdiction and prevention. For domestic interdiction, DOD uses coastal patrol ships in conjunction with air surveillance and cued intelligence to detect the illegal transport of drugs either through the air or on the sea. DOD also directly supports other law-enforcement agencies, such as the U.S. Customs Service, along the southwest border by developing and providing drug detection instruments, trucks, and containers at U.S. ports of entry (ONDCP, 1998, p. 29).

In 1999, the U.S. government appropriated $742.6 million for the Department of Defense drug interdiction program—$15 million above the planned figure. $7 million of this increase was for the Gulf States counter-drug initiative, and the remaining $8 million were for Caribbean/Eastern Pacific surface interdiction. (S-2132 Appropriation Bill, 1999) The Department of Defense's share of the FY99 federal drug control budget totaled $742.6 million was—4.3% of $17.1 billion. If the Department of Defense were granted the same percent of the tax revenues and DWL savings realized under legalization, then it would have an additional $1.76 billion annually to spend—4.3% of $41 billion. The DoD could do a lot with $1.76 billion.

On January 10, 2002, President George Bush signed the $317 billion FY02 Defense appropriations bill into law. One contentious issue in the debate over this year's budget was the large expenditure required for re-capitalization. The constant political debate over the modernization of America's armed forces perfectly illustrates one opportunity cost of prohibition. Many defense hawks actually argue that the modernization of the force is the only genuinely imperative use for these funds. The Government Accounting Office's (GAO) 1996 report, *Defense Infrastructure: Budget Estimates For 1996-2001 Offer Little Savings for Modernization*, supports this belief. Nowhere in America is the modernization issue more intensely debated than in

Washington D.C. among the various services, defense contractors, politicians, and other defense-minded activists. The GAO's 1998 report, *NAVY AIRCRAFT CARRIERS: Cost-Effectiveness of Conventionally and Nuclear-Powered Aircraft Carriers*, is evidence of this contentiousness. The report contradicted Navy leadership by questioning the need for nuclear-powered carriers versus the more affordable conventionally powered ships. Table 6.2 illustrates the Navy's force structure, which calls for 12 aircraft carriers (11 active and one reserve).

Aircraft Carriers

		(Number of Years in Service)									
		92	93	94	95	96	97	98	99	00	01
Forrestal	CV 59	37	(R)								
Saratoga	CV 60	36	37	(R)							
Ranger	CV 61	35	(R)								
Independence	CV 62	33	34	35	36	37	38	(R)			
Kitty Hawk	CV 63	31	32	33	34	35	36	37	38	39	40
Constellation	CV 64	30	31	32	33	34	35	36	37	38	39
Enterprise	CVN 65	RC	RC	RC	34	35	36	37	38	39	40
America	CV 66	27	28	29	30	(R)					
Kennedy	CV 67	24	25	26	27	28	29	30	31	32	33
Nimitz	CVN 68	17	18	19	20	21	22	RC	RC	RC	26
Eisenhower	CVN 69	14	15	16	17	18	19	20	21	22	RC
Vinson	CVN 70	10	11	12	13	14	15	16	17	18	19
Roosevelt	CVN 71	5	6	7	8	9	10	11	12	13	14
Lincoln	CVN 72	2	3	4	5	6	7	8	9	10	11
Washington	CVN 73	(C)	1	2	3	4	5	6	7	8	9
Stennis	CVN 74					(C)	1	2	3	4	5
Truman	CVN 75							(C)	1	2	3
Reagan	CVN 76				(P)						

(R) Retire (C) Commissioning (P) Procurement RC Refueling Complex Overhaul

Table 6.2. From Military Analysis Network: U.S. Navy Ships; Aircraft Carriers

Table 6.3 reveals the life-cycle costs of a nuclear- versus a conventionally powered aircraft carrier. Evidently, it costs U.S taxpayers between $2 and $4 billion to buy an aircraft carrier. So, the 1999 drug legalization tax revenues analyzed in this thesis could procure nearly one conventionally powered aircraft carrier or one nuclear-powered carrier per year. This would certainly help ensure that the United States maintains the preeminent maritime force well into this century.

The Joint Strike Fighter Program (JSFP) is another force modernization opportunity that legalization might help support. The JSFP is intended to produce an affordable, next-generation aircraft to replace the DoD's aging aircraft inventory. The

first JSF deliveries are scheduled to begin in 2008 and, as currently planned, the program will cost about $200 billion to develop and procure more than 3,000 aircraft and related support equipment for the Air Force, the Marine Corps, the Navy, and Great Britain. (*JOINT STRIKE FIGHTER ACQUISITION: Development Schedule Should Be Changed to Reduce Risks*, 2000, p.3)

Life-cycle costs for conventional and nuclear aircraft carriers
(based on a 50 year service life)

	Conventional	Nuclear
Ship acquisition investment cost **	$2,050m	$4,059m
Midlife modernisation cost after 25 years	$866m	$2,382m
Total investment cost	$2,916m	$6,441m
Average annual investment cost	$58m	$129m
Direct operating and support cost	$10,436m	$11,677m
Indirect operating and support cost	$688m	$3,205m
Total operating and support cost	$11,125m	$14,882m
Average annual operating and support cost	*$222m*	*$298m*
Inactivation / disposal cost	$53m	$887m
Spent nuclear fuel storage cost	N/A	$13m
Total inactivation / disposal cost	$53m	$899m
Average annual inactivation / disposal cost	$1m	$18m
Total life-cycle cost	$14,094m	$22,222m
Average annual life-cycle cost	*$282m*	*$444m*

**Nuclear fuel is included in investment cost.
Conventional fuel is in opps/supports cost

All amounts are in US Dollars and the article compiled from available US Navy and other sources of information.

Table 6.3. From Costello [p.3]

Additionally, DoD expects the Air Force variant of the Joint Strike Fighter to cost about $28 million per unit; the Navy variant to be between $31 million and $38 million; and the Marine Corps variant to cost between $30 million and $35 million. (*JOINT STRIKE FIGHTER ACQUISITION: Development Schedule Should Be Changed to Reduce Risks*, 2000, p.6) So, as one can see, using an average procurement cost of $32 million per aircraft, the additional tax revenues here could potentially purchase an

additional 55 Joint Strike Fighters. This would go along way towards re-modernizing America's air combat arsenal.

There are numerous other important and pressing defense-related opportunities that could be satisfied if *all* of these funds were directed at the Department of Defense. However, that is an unrealistic scenario. For this reason, we look at a few non-defense-related opportunities.

2. Social Security

In his May 2000 Cato Institute article, "'*Saving' Social Security Is Not Enough*," Michael Tanner estimates that the Social Security system faces a long-term funding shortfall of more than $20 trillion and will be running a deficit by 2015. (Tanner, 2000, p.2) He adds that, by 2030, Social Security will replace only 36.7% of an average wage earner's pre-retirement income. Today, that supplement is closer to 66%. (Tanner, 2000, p.5) Can legalizing drugs potentially help save Social Security? We think it could.
$41 billion represents over 10% of the total outlay for Social Security in 1999. Social Security represents the greatest single outlay of the federal budget. $41 billion per year could fund a substantial percent of the shortfall in Social Security or help finance the transition to a private alternative to Social Security. The DWL savings combined with the additional tax revenues could go a long way towards simply shoring up the short-term solvency of the Social Security fund, which will evidently reach a $22 billion deficit by 2015.

3. World Hunger

With an estimated $41 billion, the United States could more aggressively lead international efforts to feed an estimated 353 million people who go hungry annually. (*A Program to End Hunger: Hunger 2000*, 2000) In fact, David Beckmann, an economist and leader of the 46,000-member Bread for the World Institute, a Christian citizens' movement against hunger, says that $4 billion a year would be enough to reduce world hunger by half by the year 2015. (Palmer, 2001)

Beckmann also argues that the United States, with $5 billion a year, could eliminate hunger completely among its citizens. This breaks down to only $18 a year for

each person in the country. (*A Program to End Hunger: Hunger 2000*, 2000) The United Nations Development Program estimates that the basic health and nutrition needs all of the world's poorest people could be met for an additional $13 billion a year. So, although the goal of eliminating world hunger may seem overly optimistic and almost impossible, it is very achievable. $13 billion is just 30% of $41 billion.

4. Education

Another area where the DWL savings might be used to facilitate progress is the U.S. educational system. According to U.S. Census Bureau's Census 2000, there are approximately 61.3 million children between six and 19 years of age—comprising approximately 21.78% of the U.S. population. (U.S. Census Bureau, Census 2000) If we accept this broad age group as representative of all of America's school-age children, then the $41 billion generated annually by legalizing drugs equates to something like $670 per American student per year.

Another, more disturbing impetus for this investment was revealed when the results of the Organization for Economic Cooperation and Development's Program for International Student Assessment (PISA) were released in 2001. The PISA assessed a total of 265,000 15-year-olds from 28 industrialized nations in literacy, mathematics, and science. Unlike other international assessments, which focus on topics covered in classroom curricula, PISA examined students' ability to apply their knowledge in real-life situations. (Hoff, 2001) The fact that American children scored in the middle was not overly surprising. What is surprising, however, is that, although experts believe many of the best readers in the world live here, so do many more of the worst. The gap between America's best readers and its worst is wider than in any other country, according to PISA results. While that gap between high and low scores is not as pronounced in math and science, it is still greater for the United States than for most of the nations in the study.

The United States scored near the international average in all of the evaluated categories, but only because the top performers balanced out the poor performers. Table 6.4 illustrates how various American ethnic groups ranked on the PISA. (Bracey, 2002)

	READING	MATHEMATICS	SCIENCE
White Students	2nd	7th	4th
Black Students	26/29th	27/30th	27/30th
Hispanic Students	26/29th	27/30th	27/30th

Table 6.4. Ranks of American Ethnic Groups. From Bracey, 2002.

Based on this and other evidence, there is a segment of our society that insists America must invest in education, not in well-established suburban neighborhoods, but, rather, in the inner-city schools that have, in their opinion, under-funded budgets and under-staffed classrooms. This segment of society believes the government should spend more money on public education despite the fact that these problems developed in an era in which per-capita government spending on public schools more than doubled. In our opinion, $670 per student per year could go a long way toward improving our educational system, though the additional money might prove to be more effective in the hands of parents.

5. Tax Break Anyone?

One final opportunity that might interest many Americans is a large income tax break that could result from drug legalization. In 1999, the U.S. government collected more than $1,743 billion in taxes—of which $791 billion were individual income taxes. (*A Citizen's Guide to the Federal Budget. Budget of the United States Government Fiscal Year 1999*, 1999). $41 billion represents 5.2 percent of $791 billion. Thus, just off the top, redirecting all of these funds to reduce income taxes could reduce the total personal income taxes paid by Americans by 5.2%. Let's break this down a bit.

In 1999, the top one percent of income earners paid 36.2 percent of all federal income taxes. Incidentally, that's a little more disturbing (to us anyway) when you discover that the same one percent earned only 19.5 percent of the income. The top five percent of income earners paid 55.5 percent of total federal income taxes, and the top ten percent paid 66.5 percent. The top 25 percent, lastly, paid 83.5 percent of income taxes! (Boortz, 2002). With these percentages in mind, let's consider some savings.

What would be the result, for example, if we spread a $41 billion tax cut across all tax brackets? Let's reduce each marginal tax rate by 5% and see. The 2001 marginal tax rates for persons filing their taxes as "Married Filing Jointly" are listed below. The third column contains the value of the new marginal tax rate after calculating a 5% reduction.

Income Range	Marginal Tax Rate	New Marginal Tax Rate
0$ - 45,200	15%	14.25%
$45,201 - $109,250	27.5%	26.125%
$109,251 - $166,500	30.5%	28.975%
$166,501 - $297,350	35.5%	33.725%
$297,351 and Above	39.1%	37.145%

If the top 25 percent of income earners paid 83.5 percent of the taxes, then the bottom 75% of income earners paid only 16.5 percent, or roughly $130.5 billion in income taxes in 1999. If we legalized drugs and reduced the income tax rates with the resulting savings and revenues from the elimination of prohibition, we could reduce the total income tax bill for the bottom 75 percent of American income earners by nearly one-third. That's a pretty good tax break!

D. CONCLUSION

The savings realized under legalization could fund any number of combinations of ideas. Certainly, Republicans, Democrats, Libertarians, and others would all have competing interests. We are not sure what our nation would be like under legalization. We are concerned that our children's abstinence from drugs may be more a function of legality rather than social stigma and, thus, our children's use of drugs may, in fact, increase in the absence of prohibition. In other words, we are concerned that as the "forbidden fruit" effect disappears with prohibition, we may not see, as predicted, a decrease in drug use among children. We are convinced, however, beyond all doubt that violent drug-related crimes, including murder, theft, and the destruction of property, would disappear the day after drugs are legalized. We are convinced, too, that the spread

of infectious diseases such as HIV/AIDS and hepatitis as a result of "sharing needles" would decrease dramatically—as would their associated costs to society. Finally, we are convinced that it is time for an open and honest debate about realistic alternatives to prohibition.

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